

GR-1

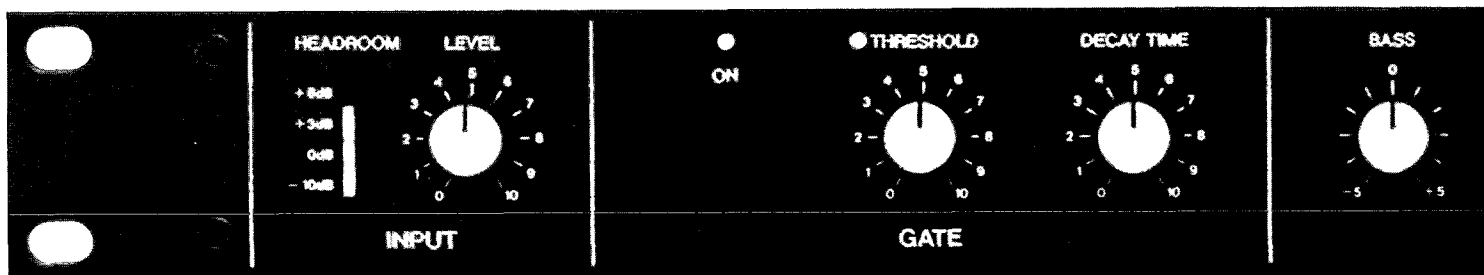
GATED REVERB OWNER'S MANUAL



KORG

Congratulations and thank you for purchasing the Korg GR-1.

To assure optimum performance and long term reliability, please read this manual carefully before use.



IMPORTANT SAFETY PRECAUTIONS

Please read and observe the following precautions to assure reliability and safety.

■ LOCATION

To avoid malfunction do not use this unit in the following locations for long periods of time:

- In direct sunlight.
- Exposed to extremes of temperature or humidity.
- In sandy or dusty places.

■ VIBRATIONS

This unit employs spring reverb units that can be excited by physical vibrations or excessive airborne sound pressure levels. Use where exposure to physical or airborne vibrations will be minimized.

■ POWER SUPPLY

- Use only with rated AC voltage. If you will be using this unit in a country having a different voltage, be sure to obtain the proper transformer to convert to rated voltage.
- To help prevent noise and degraded sound quality, avoid using the same outlet as other equipment or branching off extension cords shared by other equipment.

- Noise interference (hum) may occur if used near the power supply transformers of other electrical equipment. Again, care is advised when selecting a suitable place to use this unit.

■ INPUT/OUTPUT JACKS AND CONNECTION CORDS

For input and output connections to the rear panel of this unit be sure to use standard guitar cords (that is, cords having mono 1/4" phone plugs). Never plug any other kind of cord into these jacks.

■ HANDLE GENTLY

Knobs and switches are designed to provide positive operation with a light touch. Excessive force may cause damage.

■ MAINTENANCE

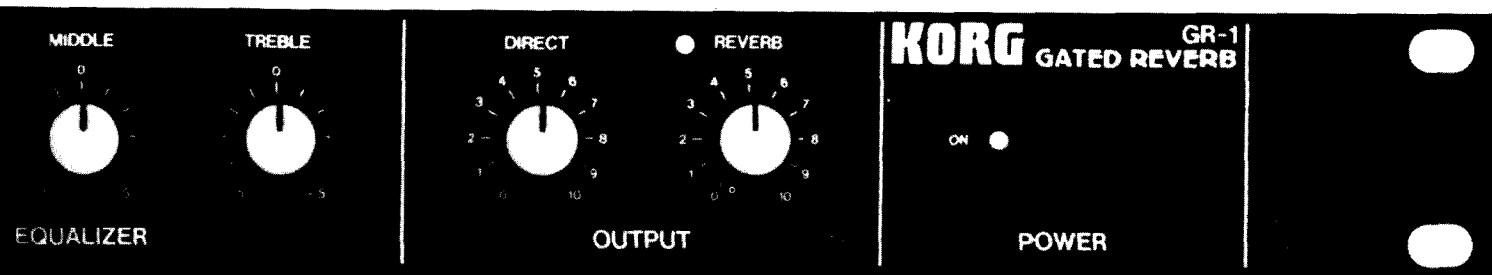
Wipe the exterior with a soft, dry cloth. Never use paint thinner, benzene or other solvents. Never use inflammable polishing compounds.

■ KEEP THIS MANUAL

Store this manual in a safe place for future reference.

MAJOR FEATURES

- 1 Compact yet employs two high quality spring reverberators to deliver stereo reverb. Stereo reverberation can be simulated from a single mono input.
- 2 Built-in gate circuit allows input threshold and reverb decay time control.
- 3 A 3-band equalizer enables adjustment of reverb tone color.
- 4 An input mode switch permits handling of stereo as well as mono inputs.



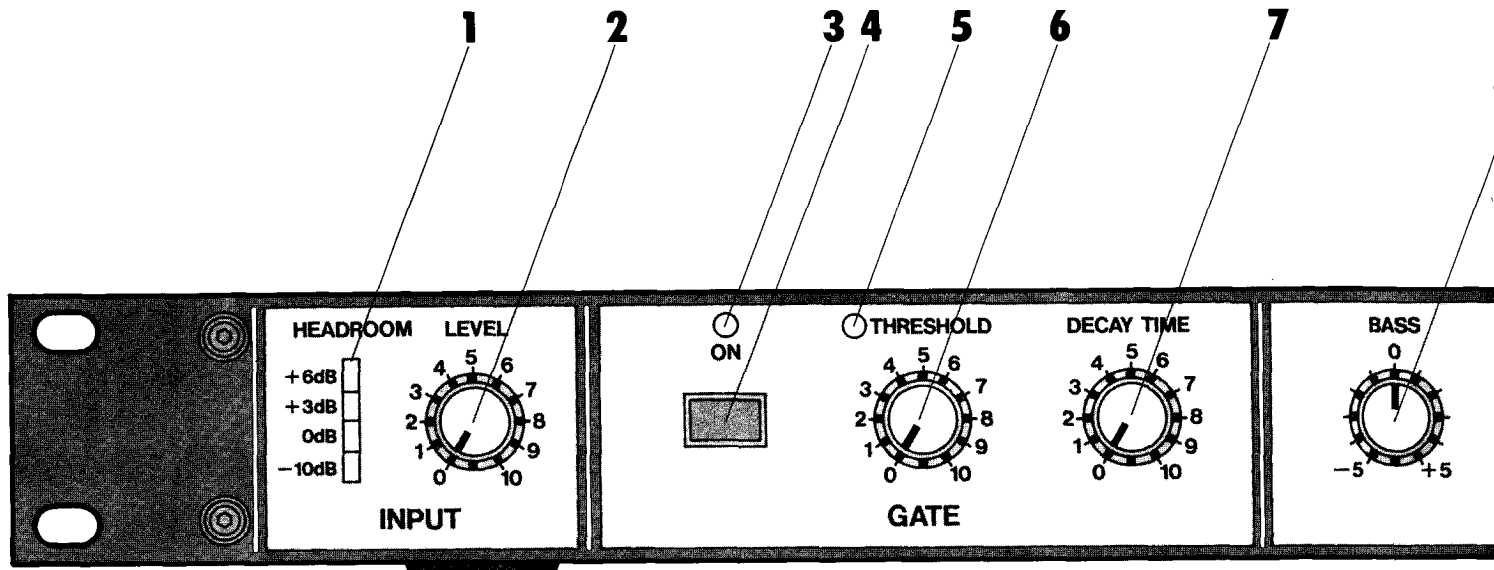
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1

Features and Functions

1. FRONT PANEL FACILITIES



INPUT SECTION

1. HEADROOM Indicator

Input level should be adjusted so that the +6dB LED lights up occasionally on the highest signal peaks.

2. LEVEL control

Use to adjust input signal level.

GATE SECTION

3. GATE ON LED

Illuminates when the GATE switch is turned on.

4. GATE switch

Turns the gate circuit on and off.

5. THRESHOLD LED

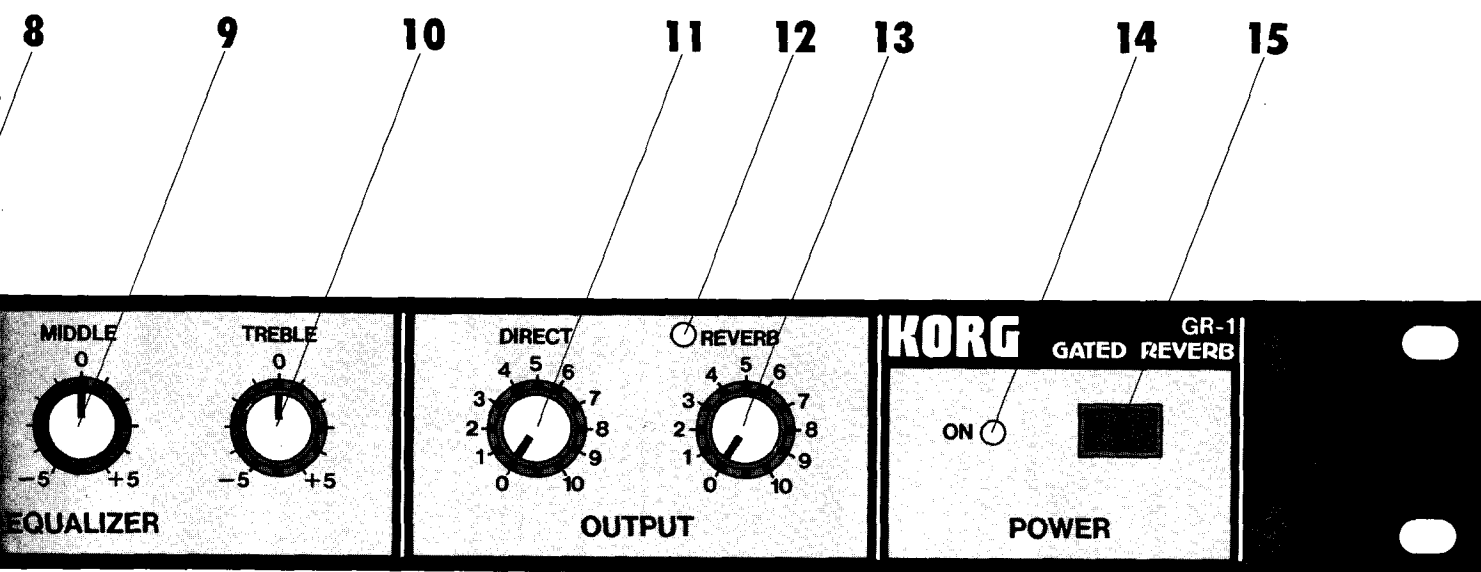
Illuminates when the gate opens and the reverb sound is output.

6. THRESHOLD level control

Sets the level that the input signal must reach before the gate opens and the reverb sound is output. (See section on gate settings.)

7. DECAY TIME control

Controls reverberation time when the gate circuit is on. Reverberation time is about two seconds when the GATE switch is off.



EQUALIZER SECTION

8. BASS tone control

For adjustment of low-range tone (around 200Hz) characteristics of the reverb output.

9. MIDDLE tone control

For adjustment of midrange tone (around 800Hz) characteristics of the reverb output.

10. TREBLE tone control

For adjustment of high-range tone (around 4kHz) characteristics of the reverb output.

OUTPUT SECTION

11. DIRECT level control

Adjusts level of direct sound in output.

12. REVERB ON LED

Illuminates when reverb is switched on by foot switch connected to rear panel REVERB ON/OFF jack. If no foot switch is connected to the jack then this LED stays on.

13. REVERB level control

Adjusts level of reverb sound in output.

POWER SECTION

14. POWER ON LED

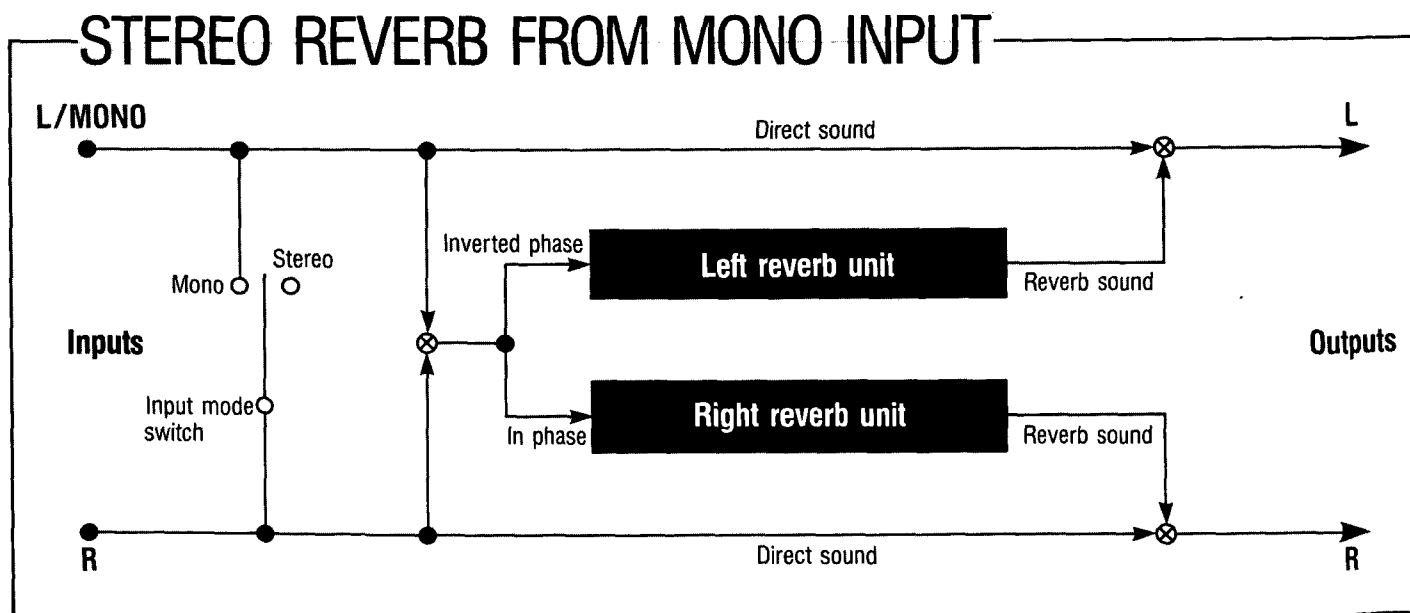
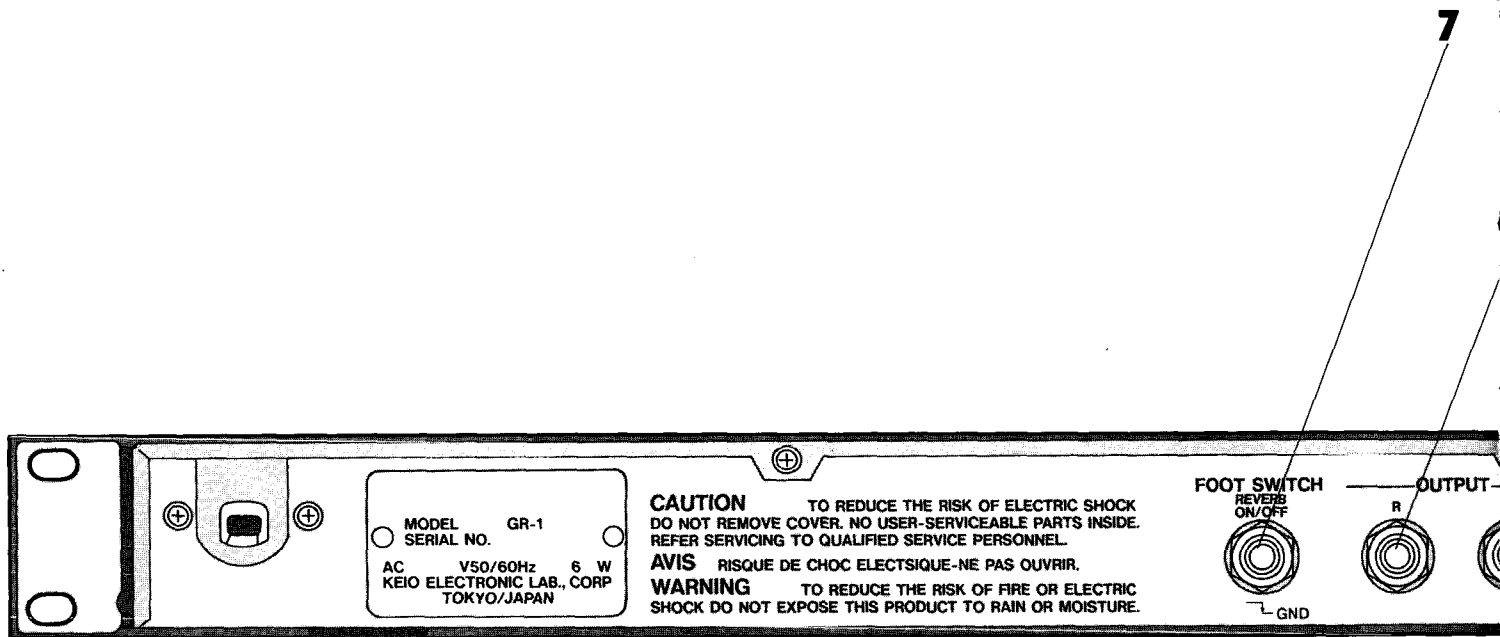
Illuminates when GR-1 power is on.

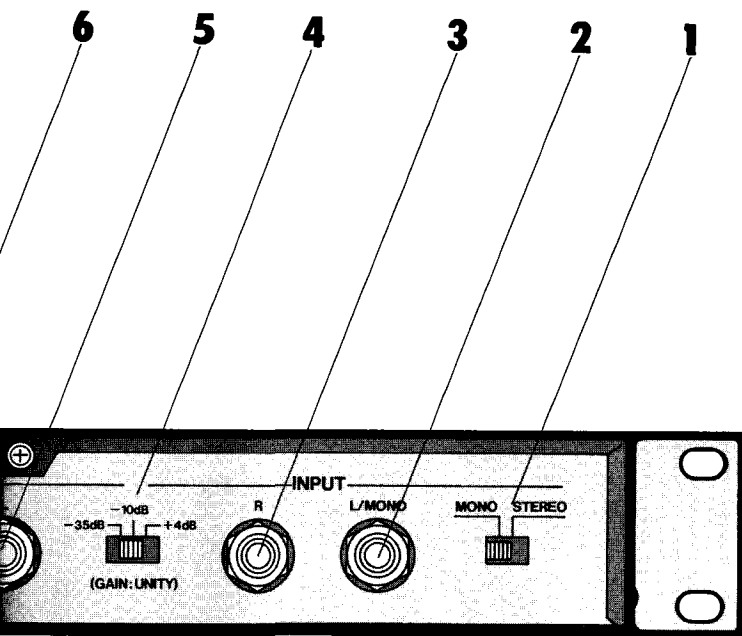
15. POWER switch

To avoid transient noise, output is muted for about three seconds after power is turned on. Neither the direct sound nor the reverb sound is heard until after the muting period is completed.

1 FEATURES AND FUNCTIONS

2. REAR PANEL FACILITIES





The input signal from the L/MONO jack is split. One of the signals is fed to one reverberator, the other signal has its phase inverted and is fed to the other reverberator. The signal phase difference is enhanced by minor response variations in the two reverberators. When the two reverb signals are mixed separately with the direct signals a simulated stereo effect is created. To make this effect audible, the left and right outputs should be reproduced through separate amplifiers.

NOTE:

This simulated stereo reverb effect is essentially the same whether the GR-1 is used in the mono or stereo input mode. In the stereo mode the two input signals are mixed before being applied to the reverberators. (However, the direct signals remain independent.)

1. MONO/STEREO input mode switch

For selection of mono input mode or stereo input mode.

2. LEFT/MONO input jack

In the stereo input mode this jack is used for the left channel input signal. In the mono input mode, use only this jack for input signal connection.

3. RIGHT input jack

For right channel input when in the stereo input mode. Not used in the mono input mode.

NOTE:

Do not connect anything to the RIGHT ("R") input jack when in the mono input mode.

4. ATTENUATOR switch

Set this selector to match input signal level according to your input signal source. Refer to the chart below.

| Switch position | Source of input signal |
|-----------------|--|
| +4dB | Mixing console, professional studio and P.A. equipment. |
| -10dB | Synthesizers, other electronic keyboards, semi-pro audio and PA equipment. |
| -35dB | Microphone, other low-output equipment. |

* GR-1 input and output levels are at unity. Output level is the same as the input level selected by the ATTENUATOR switch.

5. LEFT output jack

Provides mix of left channel reverb signal and direct signal.

6. RIGHT output jack

Provides mix of right channel reverb signal and direct signal.

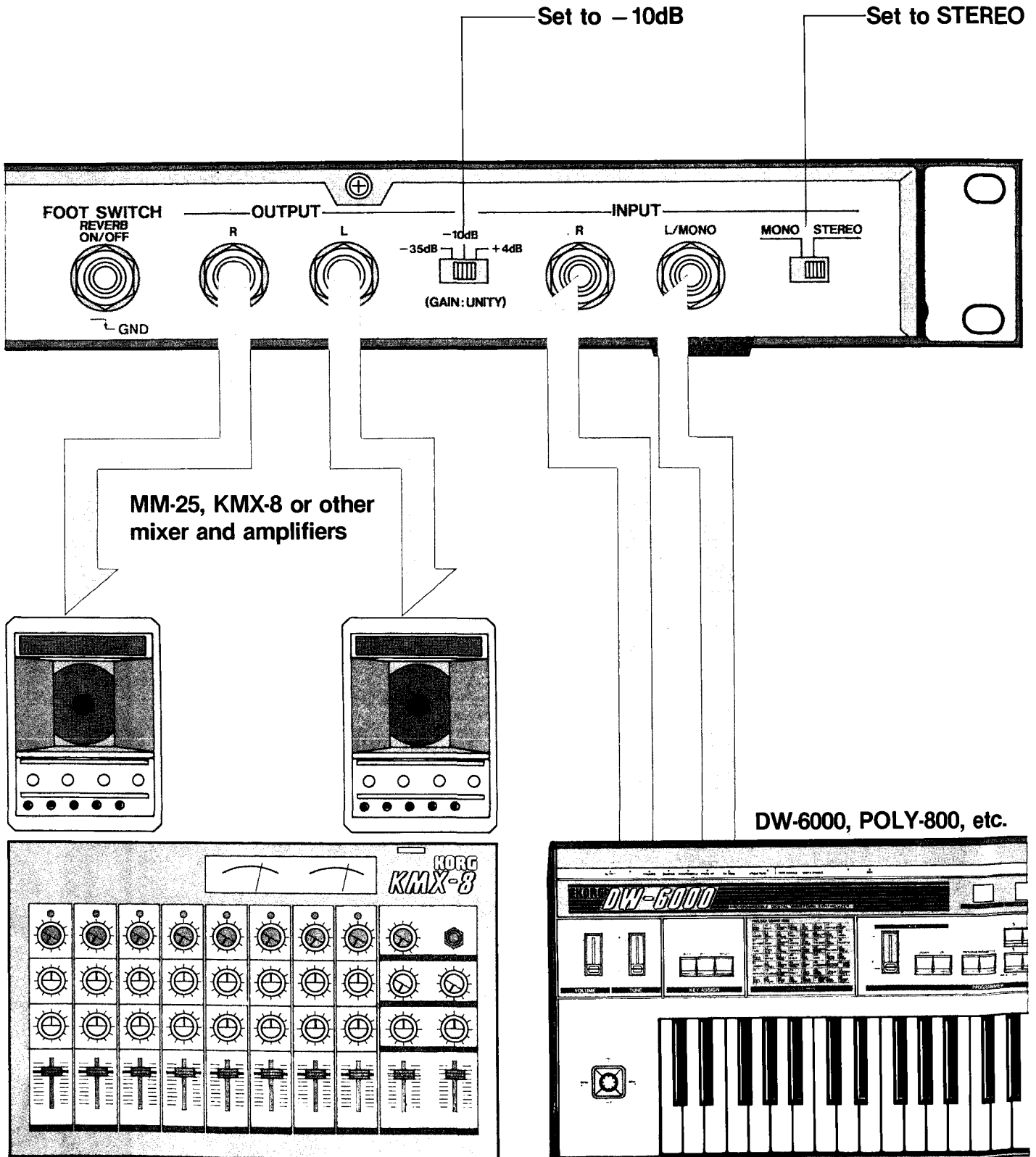
7. REVERB ON/OFF jack

For foot switch control of reverb on/off switching. Use a foot switch such as the PS-1 (a "momentary," normally open type that switches to ground when depressed). The front panel REVERB LED illuminates when reverb is on. When switched off, no reverb is provided in the left or right output signals; only the direct sound is heard.

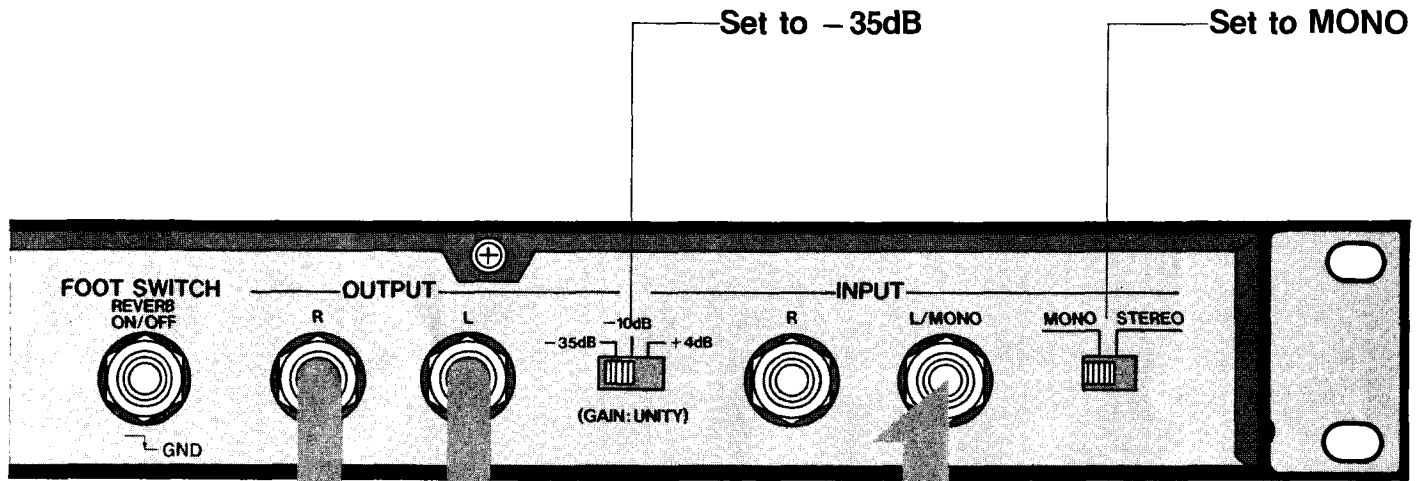
2

CONNECTIONS

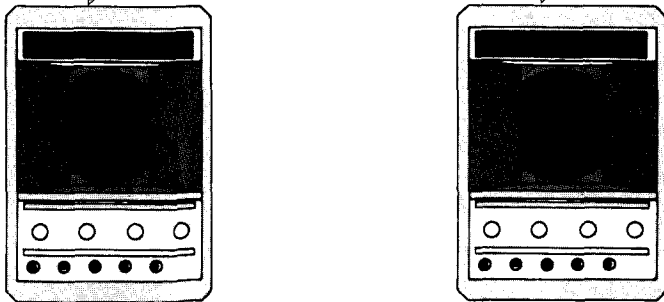
1. Connection to a keyboard having stereo outputs.



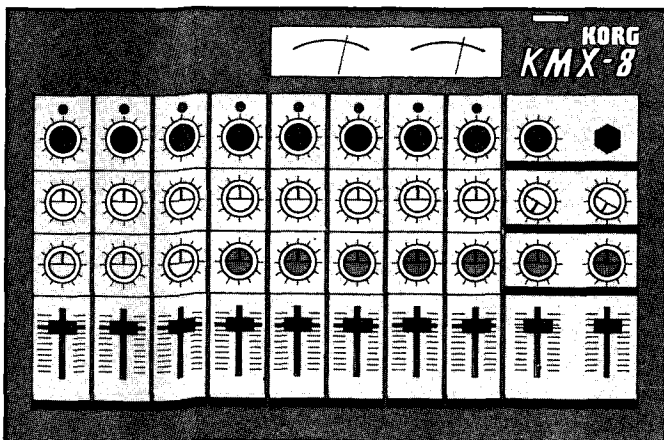
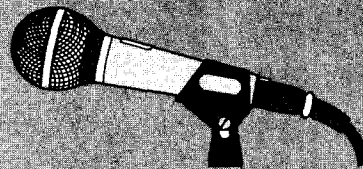
2. Microphone input.



MM-25, KMX-8 or other mixer and amplifiers



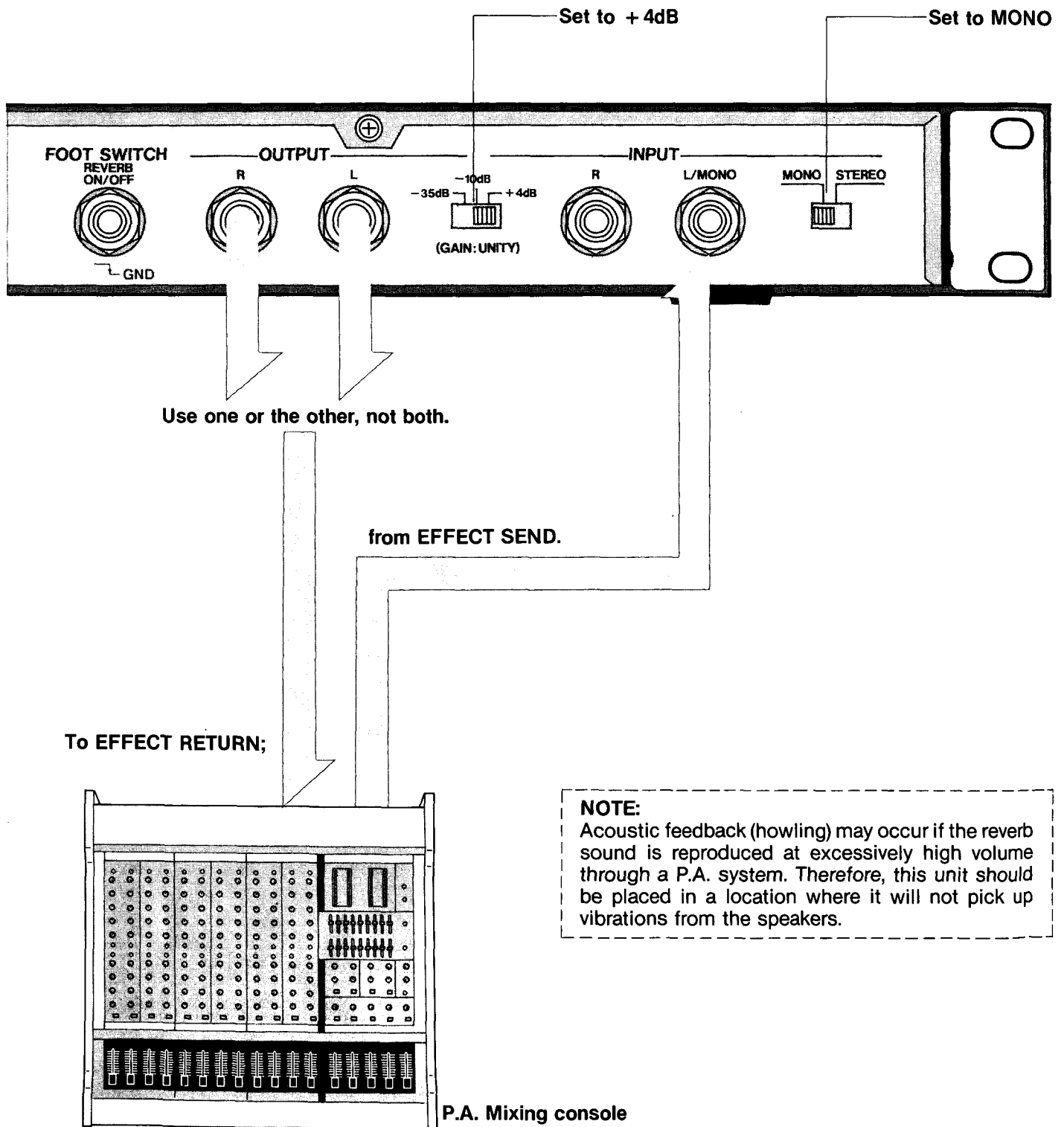
Microphone or other low-level source.



- * If using only one amp then only one of the outputs (L or R) needs to be connected.
- * Use a preamp or mixer for electric guitar inputs or other sources having high output impedance. Connect the preamp or mixer output to the GR-1 input.

2 CONNECTIONS

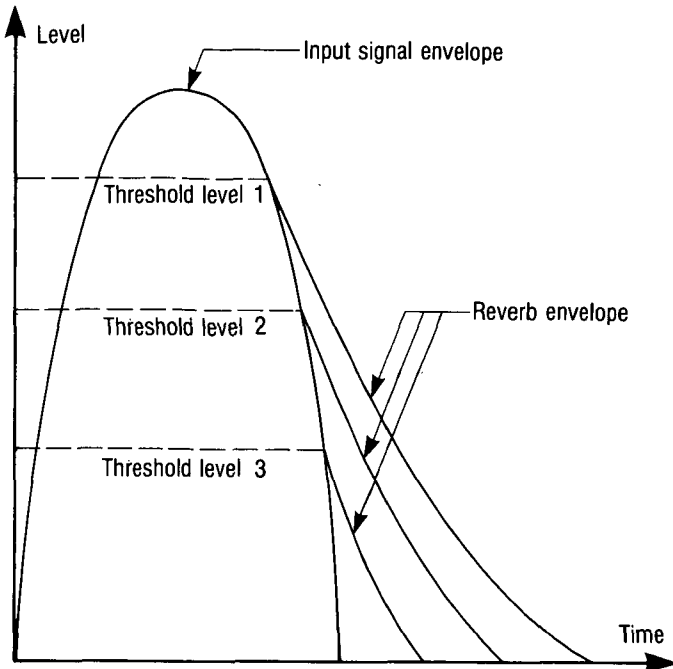
3. Connection to a mixing console.



3

GATE SETTINGS

1. THRESHOLD level setting. _____



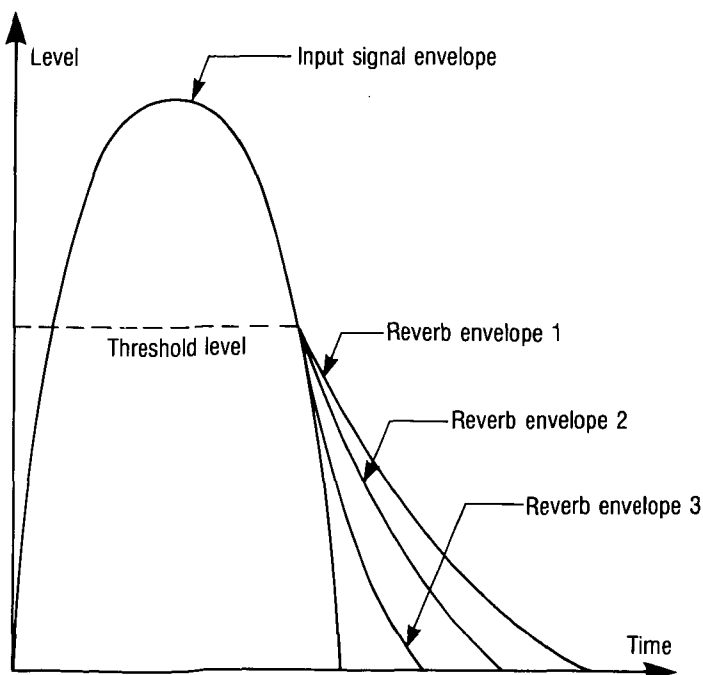
The threshold level is the minimum signal level that will cause the gate to open and allow the reverb sound to be sent to the outputs. This also affects the reverb time. The chart here shows the relationship between threshold level and reverb time, assuming a fixed decay time setting.

The threshold level is increased when the threshold level control is turned toward "10".

NOTE:

No reverb sound will be heard in the output as long as the input signal level is below the threshold level.

2. DECAY TIME setting. _____

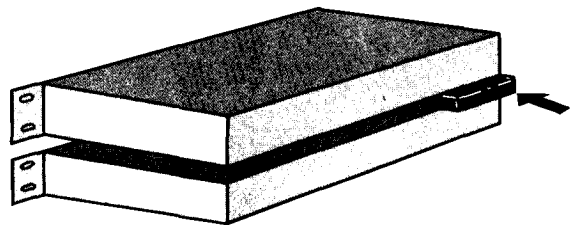
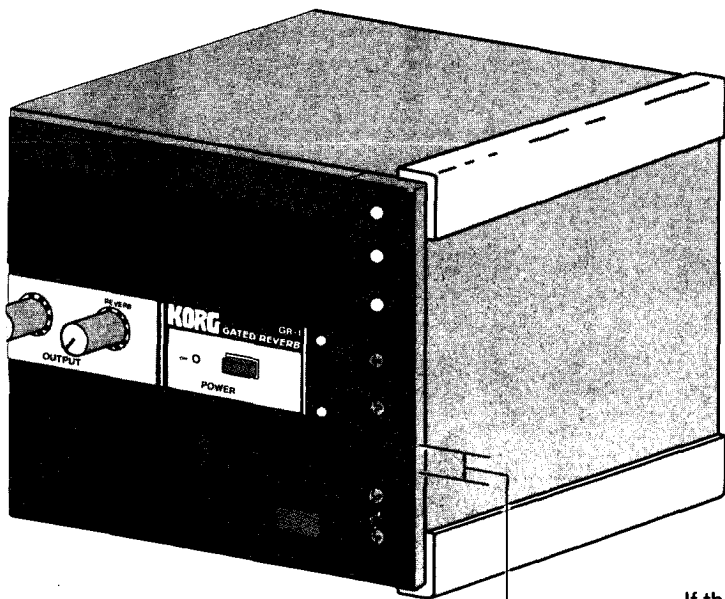
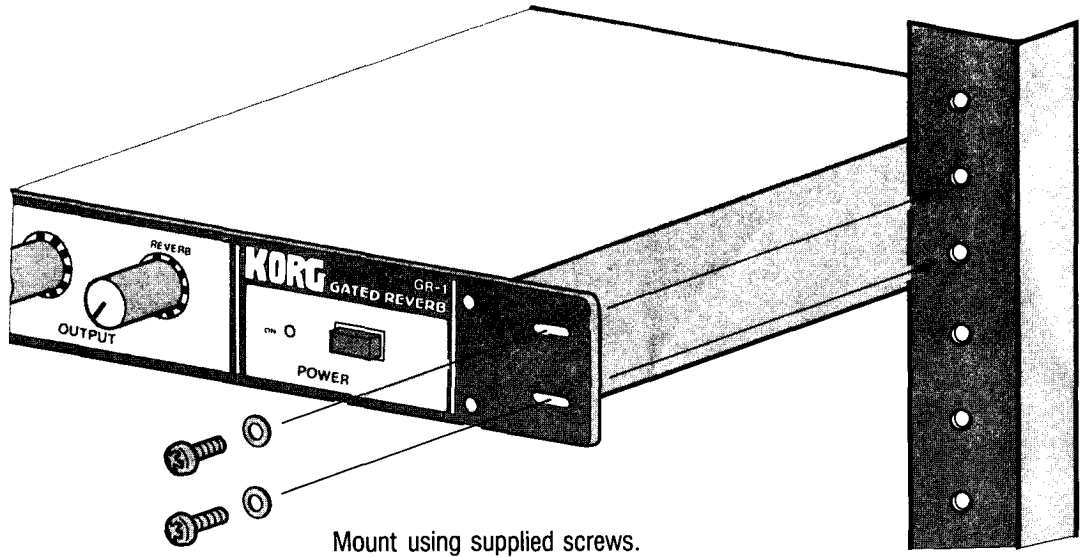


Assuming a constant threshold level, the reverb time will change as a function of the DECAY TIME setting. This relationship is expressed the adjacent chart.

* Reverb time and reverb signal level are affected by the combination of threshold level and decay time settings. Experimentation is the key to gaining an understanding of this relationship. Try different settings until you find the combination that produces the desired effect.

4

19-INCH RACK MOUNTING PROCEDURE



If there is a gap of 3mm or more between horizontally mounted units, fill in the space in the rear to prevent sagging.

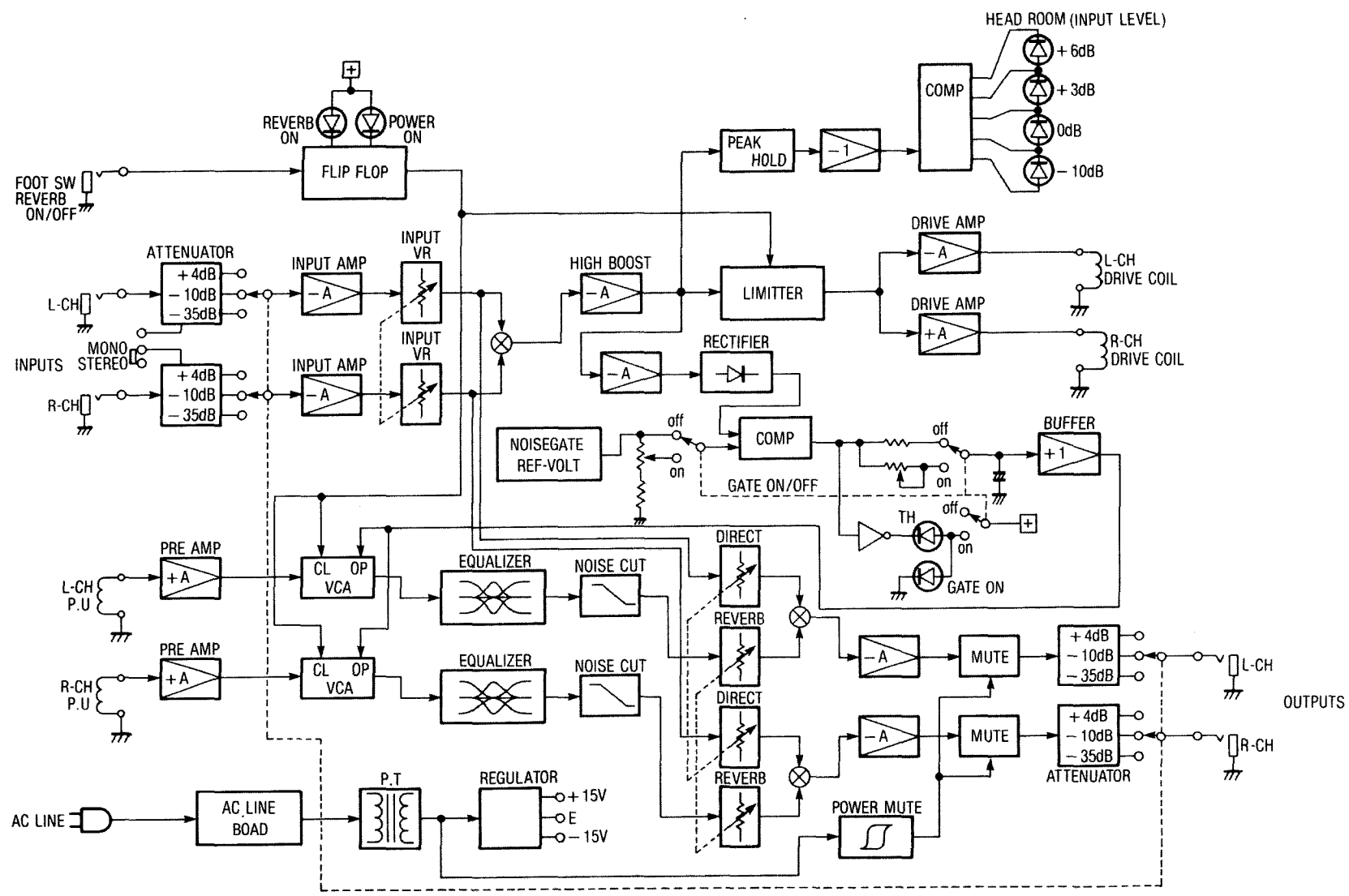


SPECIFICATIONS AND OPTIONS

| | | |
|---|--|--|
| 1. INPUT (same for R and L/MONO) | Input level -35dB -10dB +4dB | Input Impedance 6k Ω 70k Ω 170k Ω |
| 2. OUTPUT (same for R and L) | Output level -35dB -10dB +4dB | Output Impedance 400 Ω 1.2k Ω 1.2k Ω |
| 3. Frequency response | Direct: 20Hz~20kHz \pm 1.5dB Reverb: 200Hz (-8dB)~4.5kHz (-6dB) (referenced to 1kHz peak) | |
| 4. S/N ratio | Direct: 80dB or more (IHF-A) Reverb: 60dB or more (IHF-A) | |
| 5. Reverberation time | About 2 seconds or more (gate off, at 800Hz) | |
| 6. Gate | Decay time: 0.13~1.3 seconds | |
| 7. Equalizer | Bass: \pm 4dB at 200Hz Middle: \pm 6dB at 800Hz Treble: \pm 4dB at 4kHz | |
| 8. Control input | Reverb on/off control (momentary switch input) | |
| 9. Power consumption | 6W | |
| 10. Dimensions | 482(W) \times 44(H) \times 306(D) mm | |
| 11. Weight | 3.9kg | |
| 12. Supplied accessories | Rack mounting screws \times 4 | |
| 13. Options | Number cord, Pedal switch PS-1, Hard case | |

N O T I C E

Korg products are manufactured under strict specifications and voltages required by each country. These products are warranted by the Korg distributor only in each country. Any Korg product not sold with a warranty card or carrying a serial number disqualifies the product sold from the manufacturer's/distributor's warranty and liability. This requirement is for your own protection and safety.



6

BLOCK DIAGRAM

KORG Distributors List

ANDORRA

Marrugat
Avinguda Meritxell, 25, ANDORRA LA VELLA
(Principat d'Andorra)
Phone: 20132-22115

AUSTRALIA

Billy Hyde Music Pty., Ltd.
P.O. Box 472, 7 Union Street, South Melbourne,
Victoria 3205
Phone: (03) 690 6022

AUSTRIA

Weiss & Kadlec
Triester Strasse 261, 1232 Wien
Phone: 0222/674539

BAHRAIN

Marshall Boutique
P.O. Box No. 925, Government Road
Phone: 251664

BARBADOS

A & B Music Supplies Ltd.
Handley House, Prince Alfred St., Bridgetown
Phone: (809) 427-5384/429-5217

BELGIUM

Coninx Music Import
Grote Markt 5, 3600 Genk
Phone: (011)357736

BERMUDA

Riihiluoma's The Music Markers
Queen St. Black Stone 1617 Hamilton
Phone: (809-29) 50890

BRASIL

F. Purwin
Caixa Postal P.O. Box 14.475
22412 Rio de Janeiro
Phone: (021) 267-1939

CANADA

Erikson (A Division of Jam Industries Ltd.)
378 Isabey Street, St-Laurent, Quebec, H4T
1W1
Phone: 514-738-3000

CANARY ISLANDS

Musicanarias S.L.
Post code 38004, Rambla de Pulido 60, Santa
Cruz de Tenerife
Phone: 27 06 09

CHILE

Industrias Musicales Arriagada
Moneda 720 Of 110 EP, Santiago
Phone: 331819

COSTA RICA

Almacen J.M. Acuna V.
Apartado 926, San Jose

CYPRUS

Leon's Music Stores
P.O. Box 1440, Limassol
Phone: 051-73111, 051-66079

DENMARK

Hagstrom MUSIK EN GROS
Øresundsvej 148, DK-2300 København S
Phone: 01/554812

ECUADOR

Casa Musical Victor Freire
Aguirre No. 1.107 y Seis de Marzo Guayaquil,
P.O. Box 6521
Phone: 522572

EGYPT

Abdallah George Youssef
P.O. Box 2904, El Horrieh, Heliopolis, Cairo
Phone: 875618

EL SALVADOR

Almacenes Siman S.A. de C.V.
P.O. Box (06) 800, San Salvador
Phone: 22-0555

ENGLAND

Rose Morris & Co., Ltd.
32-34, Gordon House Road, London NW5 1NE
Phone: 01-267 5151

FIJI ISLANDS

CINEPHOTO ELECTRONICS
Dev of South Sea Souvenirs
P.O. Box 268, Suva City
Phone: 315355

FINLAND

Kaukomarkkinat Oy
Kutojantie 4, SF-02630, ESPOO 63
Phone: 358-0-523711

FRANCE

Gaffarel Musique SA
12, Av., Alsace-Lorraine, Z. I des Bèthunes,
Saint-Ouen-l'Aumône, 95310 Cergy
Phone: (3) 037.28.65

FRENCH POLYNESIA

CONSCIENCE MUSIC SHOP
Rua Jeanne d'Arc, P.O. Box 1860, Papeete
Tahiti
Phone: 2 85. 63

PEDRON MUSIC HOUSE

B.P. 2725, Papeete Tahiti
Phone: 3. 71. 89

GREECE

Bon Studio
8 Zaimi Str., Athens 10683
Phone: 3633.572

HONG KONG

Tom Lee Piano Co., Ltd.
9 Cameron Lane, Kowloon
Phone: 3-7221098

HUNGARY

KONSUMEX
Hungarian Foreign Trade Company
1441 Budapest, P.O. Box 58
Phone: 530-511

ICELAND

Tonkvisi
Laufasvegi 17, 101 Reykjavik
Phone: 25336

ITALY

CGD Messaggerie Musicali spa
via M.F. Quintiliano, 40, 20138 Milano
Phone: 02/50841

ISRAEL

Sommerfeld Music Centre
8, Ben-Yehuda Road, Tel-Aviv
Phone: 296775

JORDAN

Sonatina For Trade & Art Production
P.O. Box 3152, Jabal Amman, Amman
Phone: 44591

Twang Music Center

P.O. Box 35034, Amman
Phone: 44201

KOREA

White Tiger Enterprise Co.
81-2 Yunhi-Dong, Sudaemoon-ku, Seoul
Phone: 322-5557

KUWAIT

Technico Trading Co., Ltd.
P.O. Box 5032, KUWAIT, Arabian Gulf
Phone: 423917

LEBANON

Antoun's
Sadat St. Ras Beirut
Phone: 803244

MALTA

Audio & Auto Sound
61 Villambrosa Street, Hamrun
Phone: 606457

MEXICO

Casa de Musica, S.A. de C.V.
Boivar No. 75, cod Postal 06080 México, D.F.
Phone: 512-73-37, 747-23-17

Casa Veerkamp, S.A.

Grandes Almacenes de Musica
Mesones 21 col Centro de La Ciudad
Deleg Cuauhtemoc 06080 México D.F.
Phone: (91-5) 585-33-11

Casa Wagner de Guadalajara, S.A.

Corona 202, Guadala ara, Jal
Phone: 13-14-14

NEW CALEDONIA

SOUNDS PACIFIC
29 Rue de L'Alma, Noumea
Phone 27 23 93

NEW ZEALAND

Custom Music Limited
P.O. Box 4331, (16B ST MARKS RD,
NEWMARKE) Auckland 1
Phone: 500-272, 500-535

NORWAY

Hagstrom Musikk A/S
Nadderudvn 63, 1347 Høstle
Phone: 248090

PANAMA

Compania Alfaro, S.A.
Apartado 200, Panama 1
Phone: 23 0292

PARAGUAY

Music Hall SAIC
Palma 567, Asuncion

PHILIPPINES

Trebel Industries Inc.
251-267, J & L Building Edsa, Mandaluyong,
Metro Manila
Phone: 78-20-36

G.A. Yupangco & Co., Inc.

339 Buendia Av. Extension Makati, Metro
Manila
Phone: 85-97-26

POLAND

Centrala Handlowa Przemyslu Muzycznego
ul. Diuga 5, 00-263 Warszawa
Phone: 31-15-73, 31-32-31

R.O.C

Hai Kuo Musical Instrument Co., Ltd.
2nd Fl., No. 23, Sec. 1, Chung Hsiao-West
Road, Taipei, Taiwan
Phone: 02-314-3113

REP. OF SOUTH AFRICA

Hohner (South Africa) (PTY) LTD.
2nd Floor, Mayveen House, 160 President
Street, (cor. Nugget Street) 2001 Johannesburg
Phone: 402-3726

SINGAPORE

City Music Co., Ptd., Ltd.
1 Sophia Road, #02-12/13 Peace Centre,
Singapore 0922
Phone: 337 7058, 337 7545, 337 3549

Yamaha Music (Asia) Pte., Ltd.

80 Tannery Lane, Singapore 1334
Phone: 747 4374

SPAIN

Letusa S.A.
Las Fraguas s/n, Apartado de Correos 125,
Alcorcon (Madrid)
Phone: 612 3376

SWEDEN

MUSITECH AB
Malmborgsgatan 4, S-211 38 Malmö
Phone: 040 706 25

SWITZERLAND

Musik-Meyer AG
Spitalstr. 74, 8952 Schlieren
Phone: 01 730 55 05

SYRIA

Meka Music House
MGRDITCH KAZANJIAN
P.O. Box No 340, Shouhada St. Azizieh Aleppo
Phone: 20861

Sarkis Kalaydjian

102 Maternite St (Meydan), Aleppo
Phone: 43357

THAILAND

Beh Ngiep Seng Ltd., Part.
No. 110 Nakorn Kasem Soi 1 Bangkok
Phone: 222-5281

THE NETHERLANDS

Milestone B.V.
Gildenweg 16, Zwindrecht, P.O. Box 207
Phone: (078) 10 0044

U.A.E.

Abdulla Sultan Al-Sharhan
P.O. Box 1675, Deira-Dubai
Phone: 221509

U.S.A.

Unicord
89 Frost St., Westbury, New York 11590
Phone: 516-333-9100

URUGUAY

Man/Pizzo Internacional
Casilla de Correo 6243, Montevideo

WEST GERMANY

Musik-Meyer GmbH
Postfach 1729, 3550 Marburg/Lahn
Phone: 06421/81051

KORG

KEIO ELECTRONIC LABORATORY CORPORATION
15-12, Shimotakaido 1-chome, Suginami-ku, Tokyo, Japan.

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KORG®

GATED REVERB GR-1



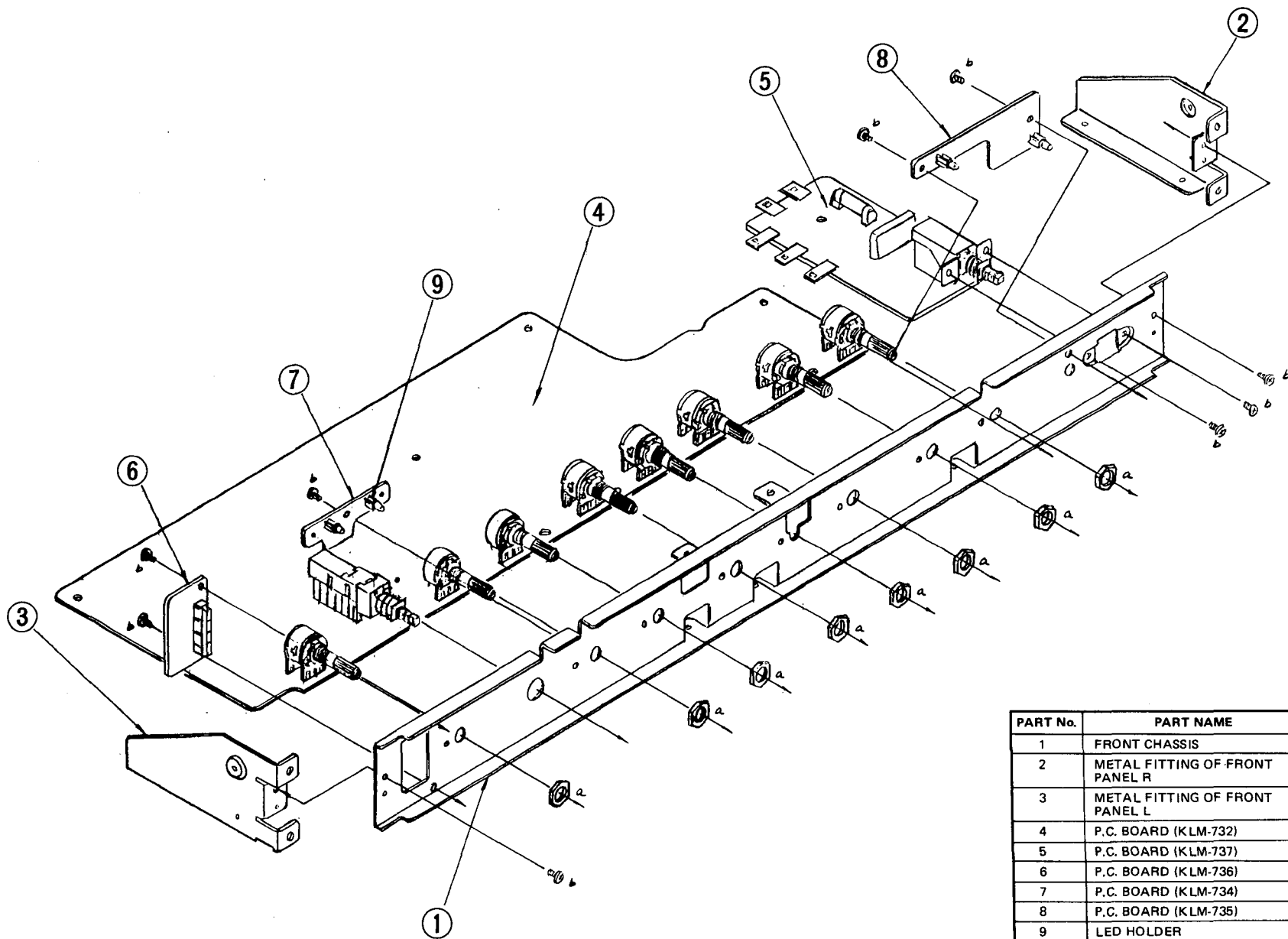
SERVICE MANUAL

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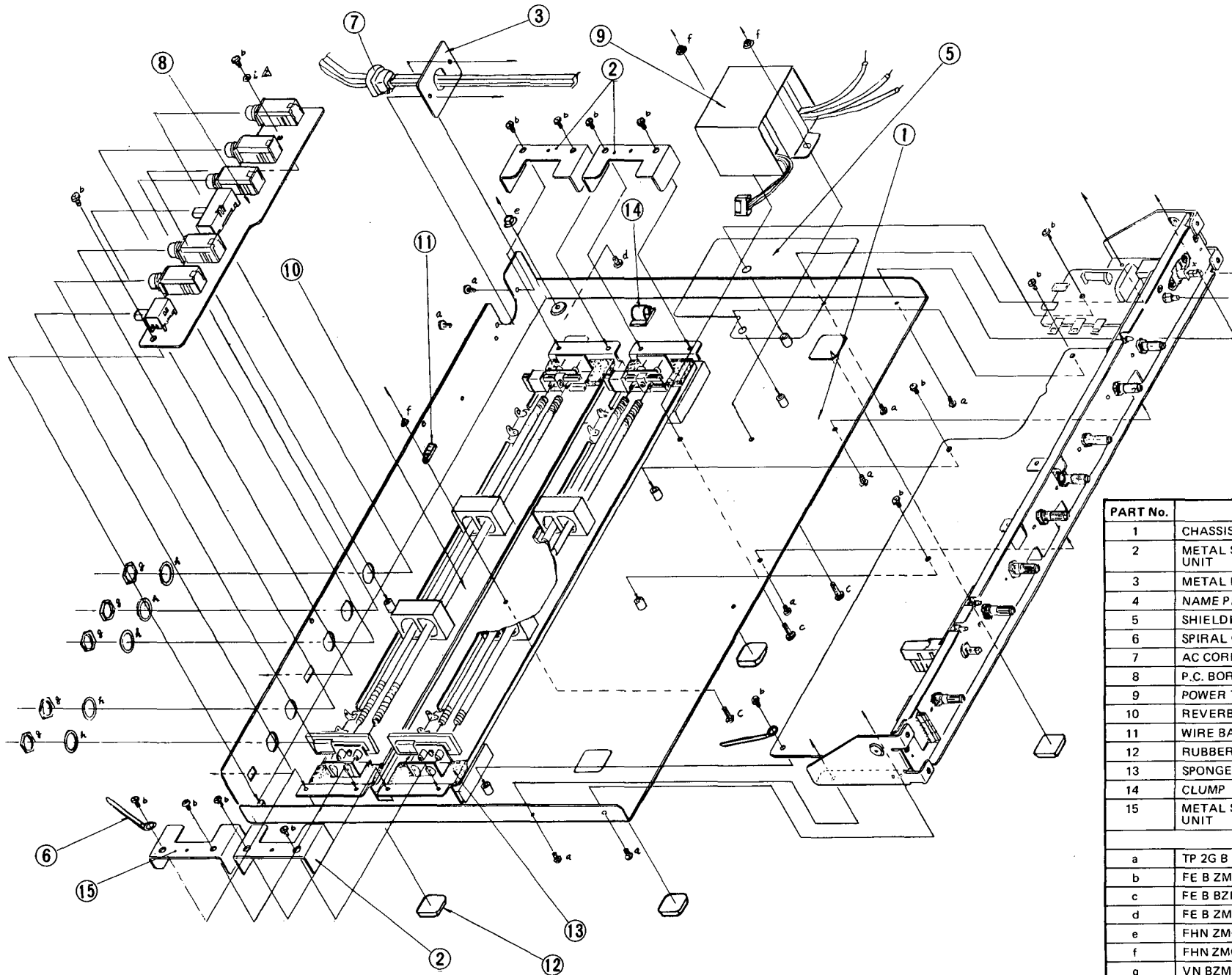
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KEIO ELECTRONIC LABORATORY CORPORATION
TOKYO/JAPAN

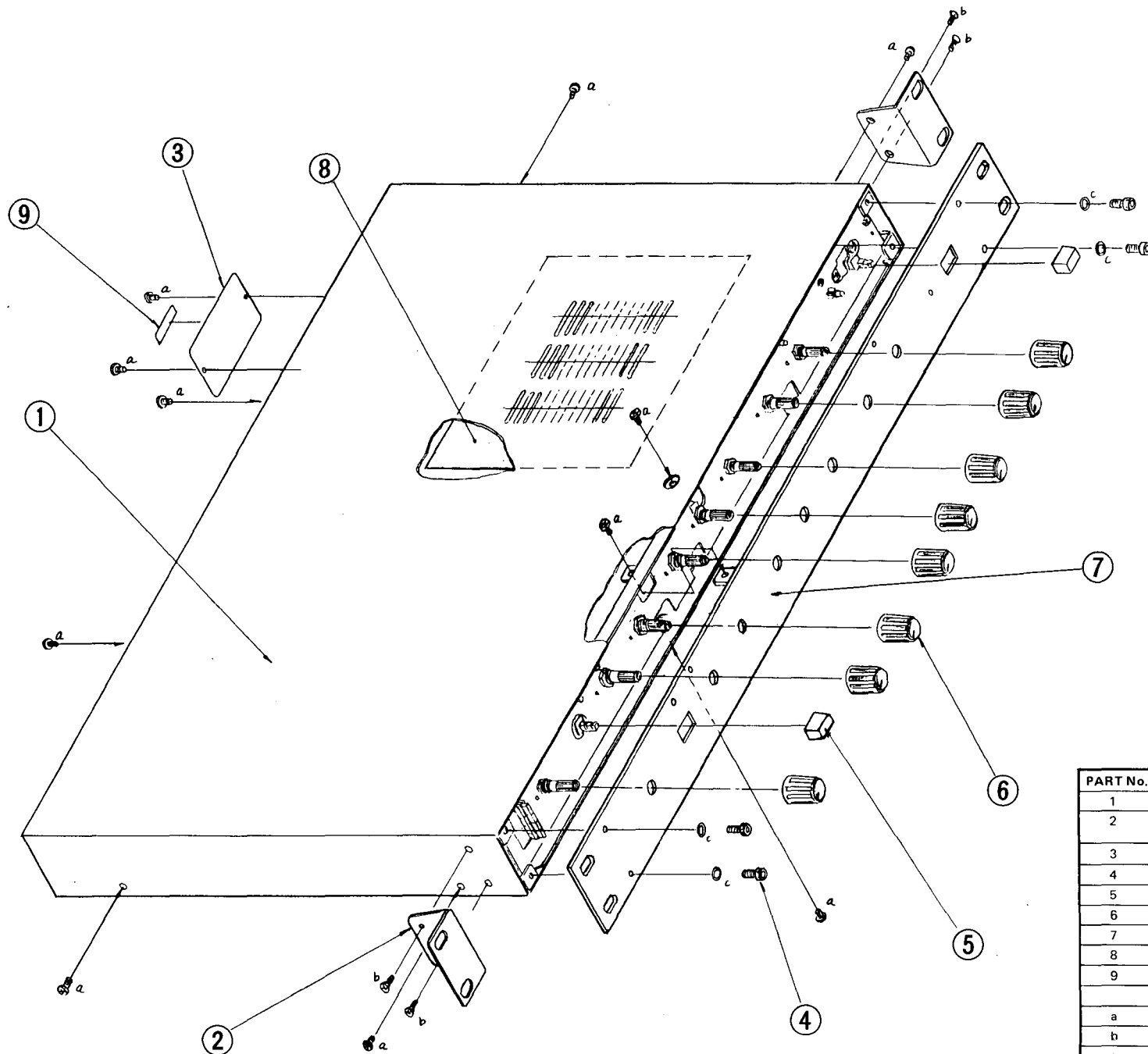
2. STRUCTURAL DIAGRAM



| PART No. | PART NAME | PART CODE |
|--------------|--------------------------------|-----------|
| 1 | FRONT CHASSIS | 64070200 |
| 2 | METAL FITTING OF FRONT PANEL R | 64063601 |
| 3 | METAL FITTING OF FRONT PANEL L | 64063600 |
| 4 | P.C. BOARD (KLM-732) | 34073200 |
| 5 | P.C. BOARD (KLM-737) | 34073200 |
| 6 | P.C. BOARD (KLM-736) | 34073600 |
| 7 | P.C. BOARD (KLM-734) | 34073200 |
| 8 | P.C. BOARD (KLM-735) | 34073200 |
| 9 | LED HOLDER | 57504000 |
| SCREWS, NUTS | | |
| a | SCREW FE B 3x6 ZMC | 70530306 |
| b | NUT VN ZMC 7 | 77330700 |

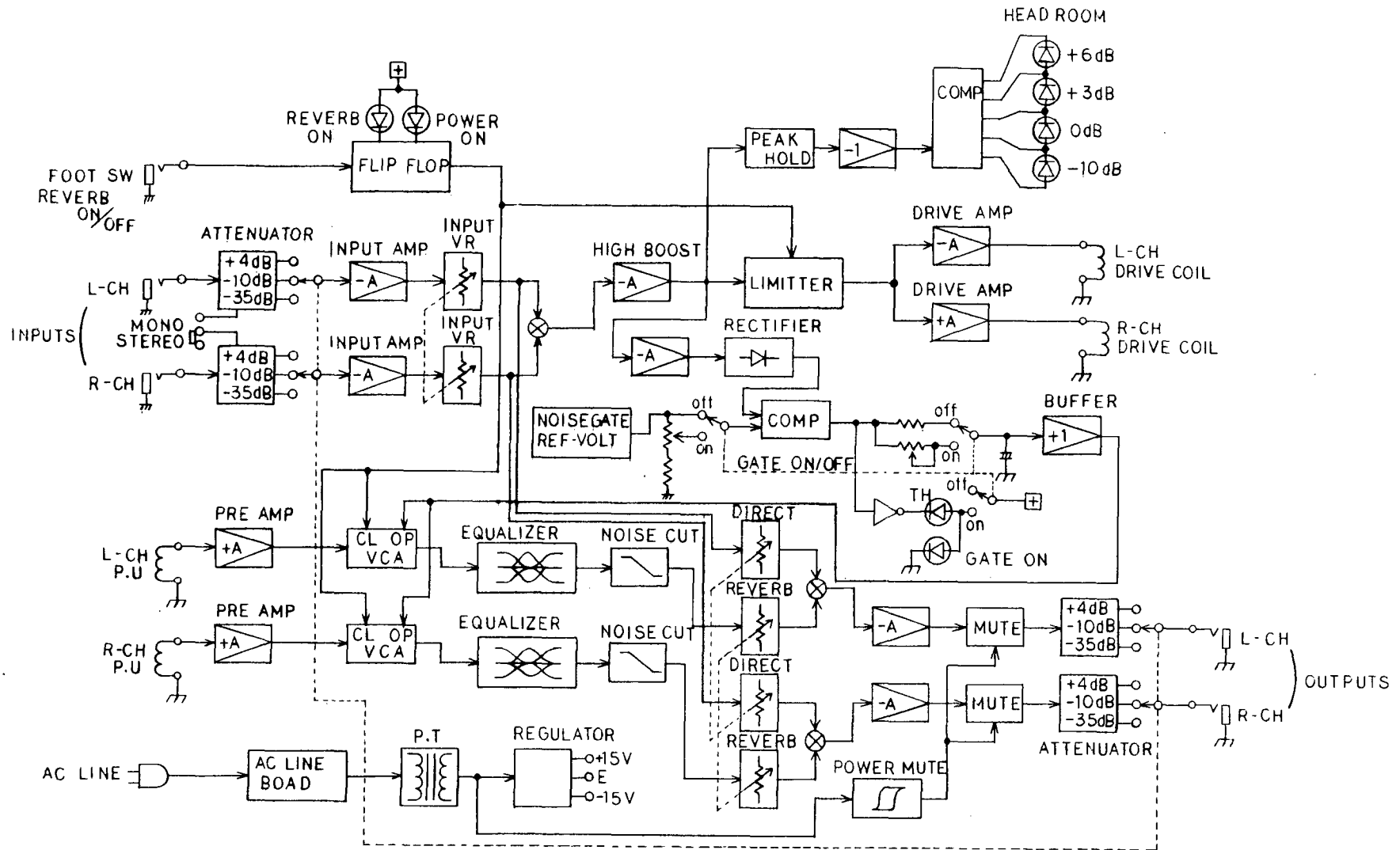


| PART No. | PART NAME | PART CODE |
|--------------|------------------------------|------------|
| 1 | CHASSIS | 64070300 |
| 2 | METAL SUPPORT OF REVERB UNIT | 64070400 |
| 3 | METAL FITTING OF BUSHING | 64064000 |
| 4 | NAME PLATE | |
| 5 | SHIELDING SHEET | 63001100 |
| 6 | SPIRAL CLIP | 54008600 |
| 7 | AC CORD BUSHING | 54000300 ~ |
| 8 | P.C. BORD KLM-733 | 34073200 |
| 9 | POWER TRANSFORMER | 40009300 ~ |
| 10 | REVERB UNIT | 41300200 |
| 11 | WIRE BAND HOLDER | 54005300 |
| 12 | RUBBER FEET | 50007800 |
| 13 | SPONGE | 50009600 |
| 14 | CLUMP | 54011100 |
| 15 | METAL SUPPORT OF REVERB UNIT | 64072400 |
| SCREWS, NUTS | | |
| a | TP 2G B BZMC 3x6 | 72560306 |
| b | FE B ZMC 3x6 | 70530306 |
| c | FE B BZMC 3x10 | 70560310 |
| d | FE B ZMC 4x8 | 70530408 |
| e | FHN ZMC 4 | 77030400 |
| f | FHN ZMC 3 | 77030300 |
| g | VN BZMC 12 | 77361200 |
| h | PHONE JACK WASHER | 79071217 |



| PART No. | PART NAME | PART CODE |
|---------------|------------------------------|-----------|
| 1 | COVER | 64068200 |
| 2 | METAL FITTING OF FRONT PANEL | 64063600 |
| 3 | NAME PLATE | |
| 4 | SCREW W/HEX. HOLE | 79090408 |
| 5 | PUSH SW KNOB | 62011100 |
| 6 | VR KNOB | 62013200 |
| 7 | FRONT PANEL | 64070100 |
| 8 | RADIATION MASK | 55005100 |
| 9 | SERIAL NUMBER SEAL | |
| SCREW, WASHER | | |
| a | TP2G B BZMC 3 x 6 | 72560306 |
| b | TP2G F BZMC 3 x 8 | 72160308 |
| c | WK BZMC 4 | 78160400 |

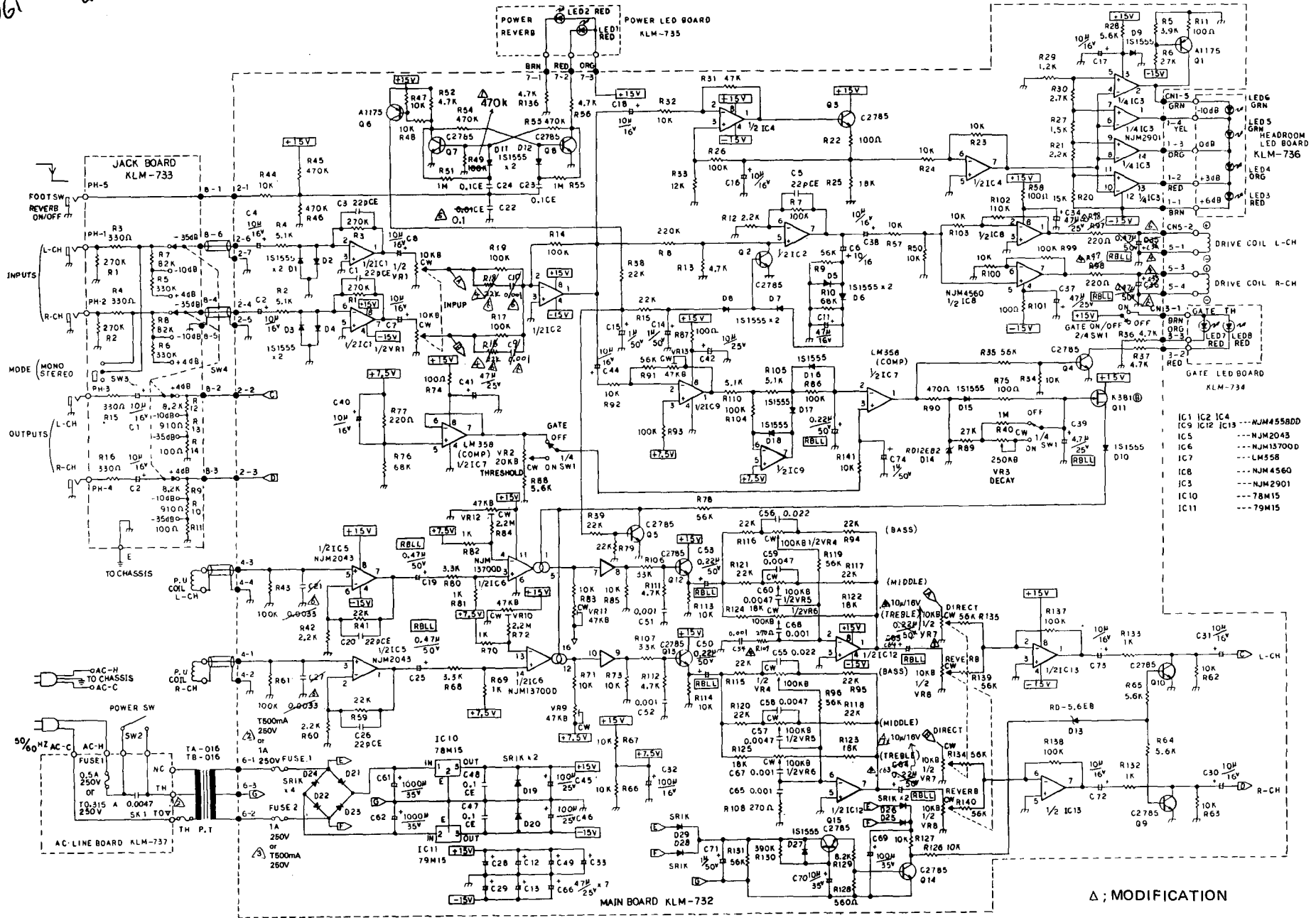
3. BLOCK DIAGRAM



061 627
 & 775

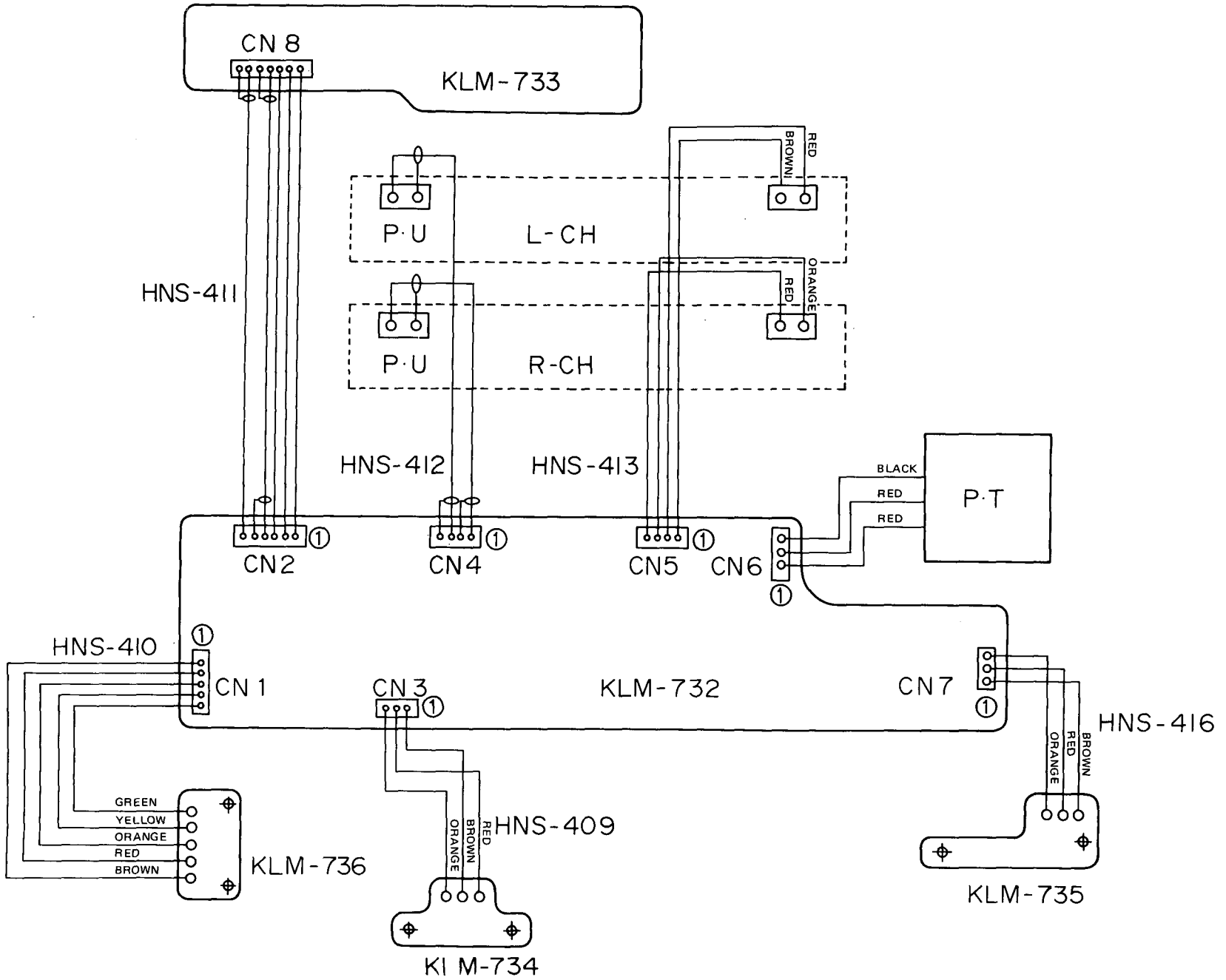
4. CIRCUIT DIAGRAM

KLM-732-7

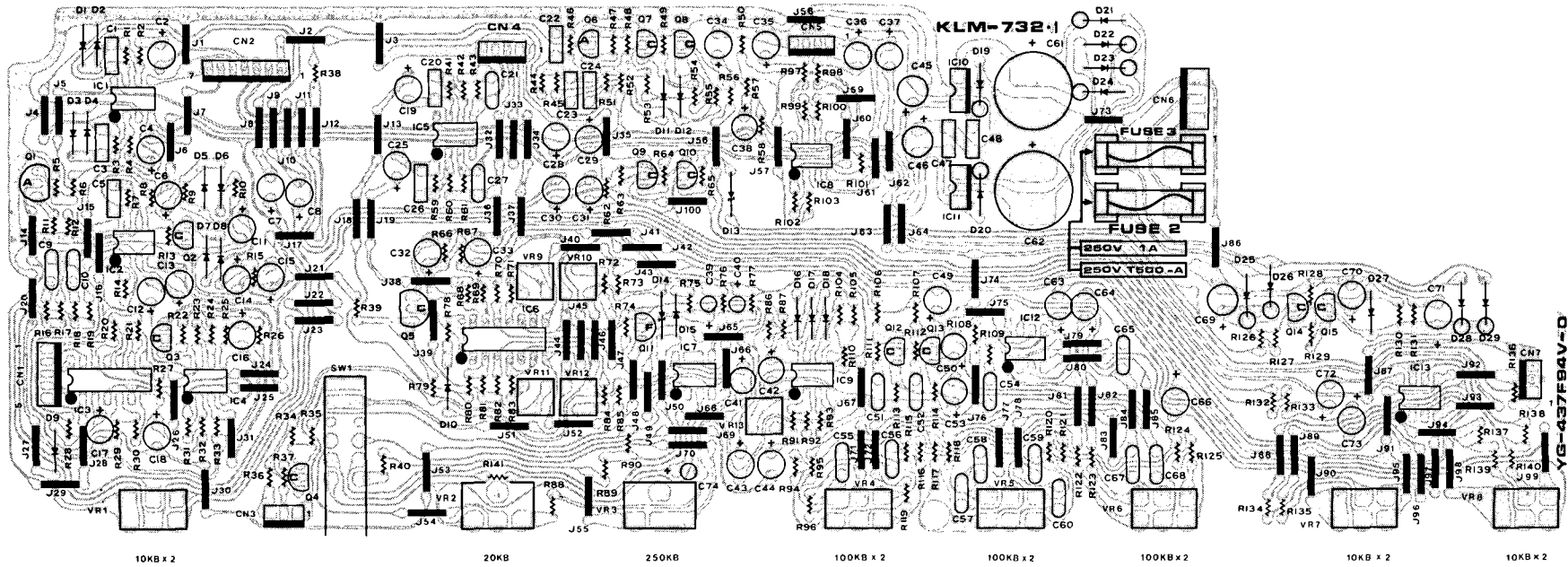


Δ ; MODIFICATION

5. CONNECTION DIAGRAM



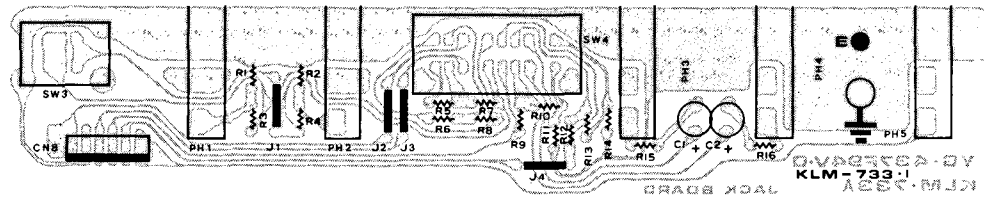
KLM-732



10KB x 2 20KB 250KB 100KB x 2 100KB x 2 100KB x 2 10KB x 2 10KB x 2

GR-1
P-393-A

KLM-733



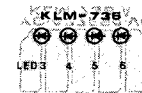
KLM-734



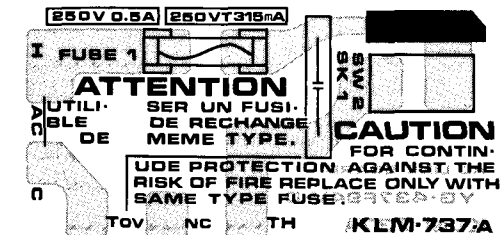
KLM-735



KLM-736



KLM-737



7. ADJUSTMENT PROCEDURES

The following items are needed:

- Noise meter
- Oscilloscope
- Noise generator
- Foot switch

Caution:

1. This unit has been adjusted completely at the factory. Do not make any adjustments other than those that are necessary for servicing.
2. Since this unit uses spring reverb, be careful to isolate it from external vibrations during adjustment.
3. Wait at least five minutes after turning on the power before beginning adjustments.

1. Left & right channel output/gain check and adjustment

- 1) Settings: Mono

| MODE | GAIN | LEVEL | GATE SW |
|------|------|-------|---------|
| MONO | +4dB | 10 | OFF |

| BASS | MIDDLE | TREBLE | DIRECT | REVERB |
|------|--------|--------|--------|--------|
| 0 | 0 | 0 | 0 | 10 |

- 2) Apply white noise at -5dBm (about 6V p-p) from the noise generator to the GR-1.
- 3) Connect noise meter to R (right channel) output.
- 4) The noise meter reading should be $-15\text{dBm} \pm 2\text{dB}$. Adjust KLM-732 VR-9 as necessary.
- 5) Connect the noise meter to L (left channel) output. The noise meter reading should be $-15\text{dBm} \pm 2\text{dB}$. Adjust KLM-732 VR-11 as necessary.

Note: One characteristic of spring reverb is that the balance between the left and right channels varies depending on the sound in the input. This is not a malfunction. Always be sure to use white noise for check and adjustment.

2. L/R offset check and adjustment

- 1) Settings:

Apply white noise at -5dBm (about 6V p-p) from the noise generator to the GR-1.

| LEVEL | GATE SW | THRESHOLD | DECAY TIME |
|-------|---------|-----------|------------|
| 10 | OFF | 0 | 0 |

| BASS | MIDDLE | TREBLE | DIRECT | REVERB |
|------|--------|--------|--------|--------|
| 0 | 0 | 0 | 0 | 10 |

Connect foot switch to rear panel.

- 2) Connect oscilloscope to L output jack and observe the output waveform (Fig-1).

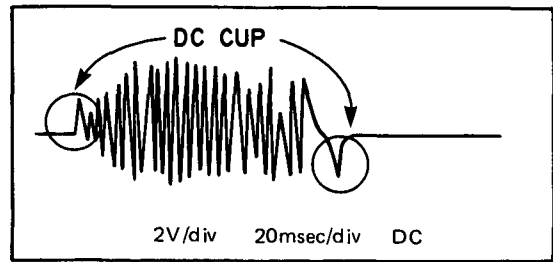


Fig-1

- 3) Repeatedly turn the foot switch on and off and confirm that DC clipping during switching is no greater than 20mV .
- 4) Adjust VR-12 for the left channel and VR-10 for the right channel if necessary.

Note: Switching noise is heard from the amplifier when this is not properly adjusted. After adjustment, check to be sure that no switching noise is heard when the unit is used with a foot switch and amplifier.

3. Gate level check and adjustment

- 1) Settings:

| LEVEL | GATE SW | THRESHOLD | DECAY TIME |
|-------|---------|-----------|------------|
| 10* | ON | 0 | 0 |

| BASS | MIDDLE | TREBLE | DIRECT | REVERB |
|------|--------|--------|--------|--------|
| 0 | 0 | 0 | 0 | 10 |

- 2) Use noise generator to apply low level noise of about 10mV p-p . (Level about $10\text{mV} \sim 60\text{mV}$)
- 3) Connect oscilloscope to output.
- 4) Gradually turn up the noise generator output level (from 10mV p-p to 60mV p-p) so that the noise meter reading goes from -92dBm to -62dBm to -57dBm . The threshold LED should illuminate when you reach the range of $30\text{mV} \sim 40\text{mV}$ ($-57\text{dBm} \pm 3\text{dBm}$). Confirm that you can observe white noise on the oscilloscope.
- 5) Adjust VR-13 if necessary.

Note: Be careful during testing since this responds to an extremely small signal. Normally VR-13 should be set to about the center position.

8. PARTS LIST

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|-------------------------|---------------------------|------------|-----------------------------|------|
| CARBON RESISTORS | | | | |
| 10416310 | 1/6JTP 100Ω | KLM-732 | | 7 |
| | | KLM-733 | | 2 |
| 10416322 | 1/6JTP 220Ω | KLM-732 | | 3 |
| 10416327 | 1/6JTP 270Ω | | | 2 |
| 10416333 | 1/6JTP 330Ω | KLM-733 | | 4 |
| 10416347 | 1/6JTP 470Ω | KLM-732 | | 1 |
| 10416356 | 1/6JTP 560Ω | | | 1 |
| 10416391 | 1/6JY TP 910Ω | KLM-733 | | 2 |
| 10416410 | 1/6JTP 1.0K | KLM-732 | | 6 |
| 10416412 | 1/6JTP 1.2K | | | 1 |
| 10416415 | 1/6JTP 1.5K | | | 1 |
| 10416422 | 1/6JTP 2.2K | | | 4 |
| 10416427 | 1/6JTP 2.7K | | | 1 |
| 10416433 | 1/6JTP 3.3K | | | 2 |
| 10416439 | 1/6JTP 3.9K | | | 1 |
| 10416447 | 1/6JTP 4.7K | | | 8 |
| 10416451 | 1/6JTP 5.1K | | | 4 |
| 10416456 | 1/6JTP 5.6K | | | 4 |
| 10416482 | 1/6JTP 8.2K | | | 1 |
| | | KLM-733 | | 2 |
| | | KLM-732 | | 25 |
| 10416510 | 1/6JTP 10K | | | 1 |
| 10416512 | 1/6JTP 12K | | | 1 |
| 10416515 | 1/6JTP 15K | | | 1 |
| 10416518 | 1/6JTP 18K | | | 5 |
| 10416522 | 1/6JTP 22K | | | 14 |
| 10416527 | 1/6JTP 27K | | | 2 |
| 10416533 | 1/6JTP 33K | | | 2 |
| 10416547 | 1/6JTP 47K | | | 1 |
| 10416556 | 1/6JTP 56K | | | 11 |
| 10416568 | 1/6JTP 68K | | | 2 |
| 10416582 | 1/6JTP 82K | KLM-733 | | 2 |
| 10416610 | 1/6JTP 100K | KLM-732 | | 13 |
| 10416611 | 1/6JTP 110K | | | 1 |
| 10416622 | 1/6JTP 220K | | | 1 |
| 10416627 | 1/6JTP 270K | | | 2 |
| | | KLM-733 | | 2 |
| 10416633 | 1/6JTP 330K | | | 2 |
| 10416639 | 1/6JTP 390K | KLM-732 | | 1 |
| 10416647 | 1/6JTP 470K | | | 5 |
| 10416710 | 1/6JTP 1.0M | | | 3 |
| 10416722 | 1/6JTP 2.2M | | | 2 |
| MYLAR CAPACITORS | | | | |
| 20402410 | 50V 0.001μF | KLM-732 | | 6 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|--------------------------------|---------------------------|------------|-----------------------------|------|
| 20402447 | 50V 0.0047μF | KLM-732 | | 4 |
| 20402522 | 50V 0.022μF | | | 2 |
| CERAMIC CAPACITORS | | | | |
| 21452220 | 50V 22pF TP | KLM-732 | | 5 |
| 21456100 | 25V 0.1μF TP | | | 5 |
| SPARK KILLER | | | | |
| 21900700 | ECQ-Ü2A472MN | KLM-737 | | 1 |
| ELECTROLYTIC CAPACITORS | | | | |
| 23513410 | 35V 1000μF | KLM-732 | | 2 |
| 25403210 | 16V 10μF | | | 17 |
| | | KLM-733 | | 2 |
| 25403247 | 16V 47μF | KLM-732 | | 1 |
| 25403310 | 16V 100μF | | | 1 |
| 25404210 | 25V 10μF | | | 1 |
| 25404247 | 25V 47μF | | | 10 |
| 25404310 | 25V 100μF | | | 2 |
| 25405210 | 35V 10μF | | | 1 |
| 25405310 | 35V 100μF | | | 1 |
| 25406110 | 50V 1μF | | | 4 |
| 25424147 | 25V 4.7μF | | | 1 |
| 25426022 | 50V 0.22μF | | | 5 |
| 25426047 | 50V 0.47μF | | | 2 |
| TRANSISTORS | | | | |
| 30400050 | 2SA1175 | KLM-732 | | 2 |
| 30420070 | 2SC2785 | | | 12 |
| FET | | | | |
| 30460022 | 2SK381-34-B/C | KLM-732 | | 1 |
| DIODES | | | | |
| 31001500 | SR1K-2 | KLM-732 | | 10 |
| 31400100 | 1S1555 | | | 17 |
| LEDs | | | | |
| 31201400 | PR 3932S | KLM-734 | | 2 |
| | | KLM-735 | | 2 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|----------------------|---------------------------|------------|-----------------------------|------|
| 31203900 | SLB-26VR3F RED | KLM-736 | | 1 |
| 31204000 | SLB-26MG3F GREEN | | | 2 |
| 31205200 | SLB-26DU3F | | | 1 |
| ZENER DIODEs | | | | |
| 31420300 | RD-5.6EB-TN-B1 | KLM-732 | | 1 |
| 31421400 | RD-12-T1-B2 | | | 1 |
| ICs | | | | |
| 32009001 | NJM-4558D-V | KLM-732 | | 6 |
| 32009006 | NJM-4560 D | | | 1 |
| 32009014 | NJM-2901 N | | | 1 |
| 32009026 | NJM-13700-D | | | 1 |
| 32009033 | NJM-78M15A | | | 1 |
| 32009034 | NJM-79M15A | | | 1 |
| 32009041 | NJM-2043D | | | 1 |
| 32021025 | LM-358 | | | 1 |
| P.C. BOARDs | | | | |
| 34073200 | KLM-732-7 | KLM-732 | | 1 |
| 34073600 | KLM-736 | KLM-736 | | 1 |
| SEMI FIXED VR | | | | |
| 35101347 | 47KB | KLM-732 | | 5 |
| VRs | | | | |
| 36017500 | K161100EBE 20KB | KLM-732 | | 1 |
| 36017701 | K161100EBE 250KB | | | 1 |
| 36204700 | K162A007FE 10KBX2 | | | 3 |
| 36204800 | K162A007FE 100KBX2 | | | 3 |
| SLIDE SWs | | | | |
| 37304900 | SLS-25-2043 | KLM-733 | | 1 |
| 37305300 | SLS-25-2022-1 | | | 1 |
| PUSH SW | | | | |
| 37507700 | SUN 192A | KLM-732 | | 1 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|---------------------------|---------------------------|------------|---|--|
| POWER SW | | | | |
| 37507800 | ESB-8213V | KLM-737 | | 1 |
| POWER TRANSFORMERs | | | | |
| 40009300 | TA-016 | | 100V UNI JAM 117 2P | 1 1 1 1 |
| 40009400 | TB-016 | | 220 GE 220 SE 240 AF 240 AU DEMKO SEMKO NEMKO 240 GE GAF FIMKO 240 RME VDE | 1 1 1 1 1 1 1 1 1 1 1 1 |
| REVERB UNIT | | | | |
| 41300200 | EA-105E | | | 2 |
| PHONE JACK | | | | |
| 45404300 | YKB21-5012 | KLM-733 | | 5 |
| FUSEs | | | | |
| 46411701 | 250V 0.5A UL | | 100V UNI JAM 117 2P | 1 1 1 1 |
| 46412003 | 250V 1.0A UL | | 100V UNI JAM 117 2P | 2 2 2 2 |
| 46461501 | 250V T315MA | | 220 GE 220 SE 240 AF | 1 1 1 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|-----------------------|---------------------------|------------|-----------------------------|------|
| 46461501 | 250V T315MA | | 240 AU | 1 |
| | | | DEMKO | 1 |
| | | | SEMKO | 1 |
| | | | NEMKO | 1 |
| | | | 240 GE | 1 |
| | | | GAF | 1 |
| | | | FIMKO | 1 |
| | | | 240 RME | 1 |
| | | | VDE | 1 |
| | | | 220 GE | 2 |
| | | | 220 SE | 2 |
| | | | 240 AF | 2 |
| | | | 240 AU | 2 |
| | | | DEMKO | 2 |
| | | | SEMKO | 2 |
| | | | NEMKO | 2 |
| | | | 240 GE | 2 |
| | | | GAF | 2 |
| FIMKO | 2 | | | |
| 240 RME | 2 | | | |
| VDE | 2 | | | |
| HARNESSES | | | | |
| 47050900 | HNS-409 | | | 1 |
| 47051000 | HNS-410 | | | 1 |
| 47051100 | HNS-411 | | | 1 |
| 47051200 | HNS-412 | | | 1 |
| 47051300 | HNS-413 | | | 1 |
| 47051600 | HNS-416 | | | 1 |
| CONNECTOR TOPs | | | | |
| 47130300 | B3B-XHA | KLM-732 | | 2 |
| 47130400 | B4B-XHA | | | 2 |
| 47130500 | B5B-XHA | | | 1 |
| 47130600 | B6B-XHA | KLM-733 | | 1 |
| 47130700 | B7B-XHA | KLM-732 | | 1 |
| CONNECTOR | | | | |
| 47150300 | B3P-VH | | | 1 |
| RUBBER FEET | | | | |
| 50007800 | 25X25X4.5 | | | 4 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|---------------------|---------------------------|------------|-----------------------------|------|
| SPONGE | | | | |
| 50009600 | MSC-E40 | | | 4 |
| FUSE HOLDERS | | | | |
| 51501600 | S-N5053 #01 | KLM-732 | | 4 |
| | | KLM-737 | | 2 |
| BUSHINGs | | | | |
| 54000300 | SR-4K-4 | | 100V | 1 |
| | | | UNI | 1 |
| | | | 117 2P | 1 |
| 54000400 | SR-5P-4 | | 240 AU | 1 |
| 54000500 | SR-6W-1 | | 220 GE | 1 |
| | | | 220 SE | 1 |
| | | | 240 AF | 1 |
| | | | DEMKO | 1 |
| | | | SEMKO | 1 |
| | | | NEMKO | 1 |
| | | | 240 GE | 1 |
| | | | GAF | 1 |
| | | | FIMKO | 1 |
| | | | 240 RME | 1 |
| | | | VDE | 1 |
| 54000501 | SR-6N3-4 | | JAM | 1 |
| WIRE BANDs | | | | |
| 54005300 | SKM-1 | | | 1 |
| 54007200 | PLT-1M | | | 7 |
| CORD BAND | | | | |
| 54007600 | NO.113 BLACK | | | 1 |
| SPIRAL CLIP | | | | |
| 54008600 | CS-8 | | | 2 |
| CLUMP | | | | |
| 54011100 | CK-07H | | | 1 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|------------------------|---------------------------|--------------------|-----------------------------|--------|
| RADIATION MASKs | | | | |
| 55005100 | 120X105 | | 100V | 1 |
| | | | UNI | 1 |
| | | | 117 2P | 1 |
| | | | 220 GE | 1 |
| | | | 220 SE | 1 |
| | | | 240 AF | 1 |
| | | | 240 AU | 1 |
| | | | DEMKO | 1 |
| | | | SEMKO | 1 |
| | | | NEMKO | 1 |
| | | | 240 GE | 1 |
| | | | GAF | 1 |
| | | | 220 SP | 1 |
| | | | FIMKO | 1 |
| | | | 240 RME | 1 |
| VDE | 1 | | | |
| LED HOLDERS | | | | |
| 57504000 | X-TYPE NO.4 5.8MM | KLM-734 KLM-735 | | 2 2 |
| AC CORDs | | | | |
| 60000102 | KE-1044B PVC. 75 | | 100V | 1 |
| 60000201 | SPT-2 18AWG SU426-58 | | UNI | 1 |
| 60000301 | CLASS1 (SU429-58) | | 117 2P | 1 |
| | | | 220 GE | 1 |
| | | | DEMKO | 1 |
| | | | SEMKO | 1 |
| | | | NEMKO | 1 |
| | | | 240 GE | 1 |
| | | | FIMKO | 1 |
| | | | 240 RME | 1 |
| | | | VDE | 1 |
| | | | 240 AU | 1 |
| 60000401 | SAA (SU428-58)3X.75 | | 240 AU | 1 |
| 60000501 | BS PLUG (SU431A-58) | | 240 AF | 1 |
| 60000901 | SEV (SU430-58) | | 220 SE | 1 |
| 60001301 | KP-4819D GTCE-3.75 | | GAF | 1 |
| 60002000 | SJT (SU338-56) 18/3MM | | JAM | 1 |
| POWER SW KNOB | | | | |
| 62011100 | SUE55102 | | | 2 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|--------------------------------------|---------------------------|------------|-----------------------------|------|
| VR KNOB | | | | |
| 62013200 | | | | 8 |
| SHIELDING SHEET | | | | |
| 63001100 | HT200 | | | 1 |
| METAL FITTINGS OF FRONT PANEL | | | | |
| 64063600 | L | | | 1 |
| 64063601 | R | | | 1 |
| FRONT PANEL BOARD | | | | |
| 64063700 | | | | 2 |
| METAL FITTINGS OF BUSHING | | | | |
| 64064000 | NO1 | | 100V | 1 |
| | | | UNI | 1 |
| | | | 117 2P | 1 |
| | | | 220 GE | 1 |
| | | | 220 SE | 1 |
| | | | 240 AF | 1 |
| | | | 240 AU | 1 |
| | | | DEMKO | 1 |
| | | | SEMKO | 1 |
| | | | NEMKO | 1 |
| | | | 240 GE | 1 |
| | | | GAF | 1 |
| 64064100 | NO2 | | FIMKO | 1 |
| | | | 240 RME | 1 |
| | | | VDE | 1 |
| | | | JAM | 1 |
| COVER | | | | |
| 64068200 | | | | 1 |
| FRONT PANEL | | | | |
| 64070100 | | | | 1 |

| PARTS CODE | PARTS NAME SPECIFICATIONS | P.C. BOARD | IDENTIFICATION NO. FUNCTION | Q'TY |
|---------------------------------|---------------------------|------------|-----------------------------|------|
| FRONT CHASSIS | | | | |
| 64070200 | | | | 1 |
| CHASSIS | | | | |
| 64070300 | | | | 1 |
| METAL SUPPORTs OF SPRING | | | | |
| 64070400 | RVRB UNI | | | 3 |
| 64072400 | RVRB UNI B | | | 1 |
| SCREWs | | | | |
| 70060512 | FE P BZMC 5X12 | | | 4 |
| 70530306 | FE B ZMC 3X6 | | | 24 |
| 70530408 | FE B ZMC 4X8 | | | 1 |
| 70560310 | FE B BZMC 3X10 | | | 3 |
| 72160308 | TP2G F BZMC 3X8 | | | 4 |
| 72560306 | TP2G B BZMC 3X6 | | | 19 |
| NUTs | | | | |
| 77030300 | FHN ZMC 3 | | | 3 |
| 77030400 | FHN ZMC 4 | | | 1 |
| 77330700 | VN ZMC 7 | | | 8 |
| 77361200 | VN BZMC 12 | | | 5 |
| WASHERs | | | | |
| 78060501 | WM 5 BZMC | | | 4 |
| 78160400 | WK BZMC 4 | | | 4 |
| 78430300 | TWU ZMC 3 | | | 1 |
| 78430400 | TWU ZMC 4 | | | 1 |
| PHONE JACK WASHER | | | | |
| 79071217 | BZMC 12X16.5X0.7 | | | 5 |
| SCREW W/HEX. HOLE | | | | |
| 79090408 | 4X8 BZMC | | | 4 |

KORG[®]

KEIO ELECTRONIC LABORATORY CORP.
15-12, Shimotakaido 1-chome, Suginami-ku, Tokyo 168

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