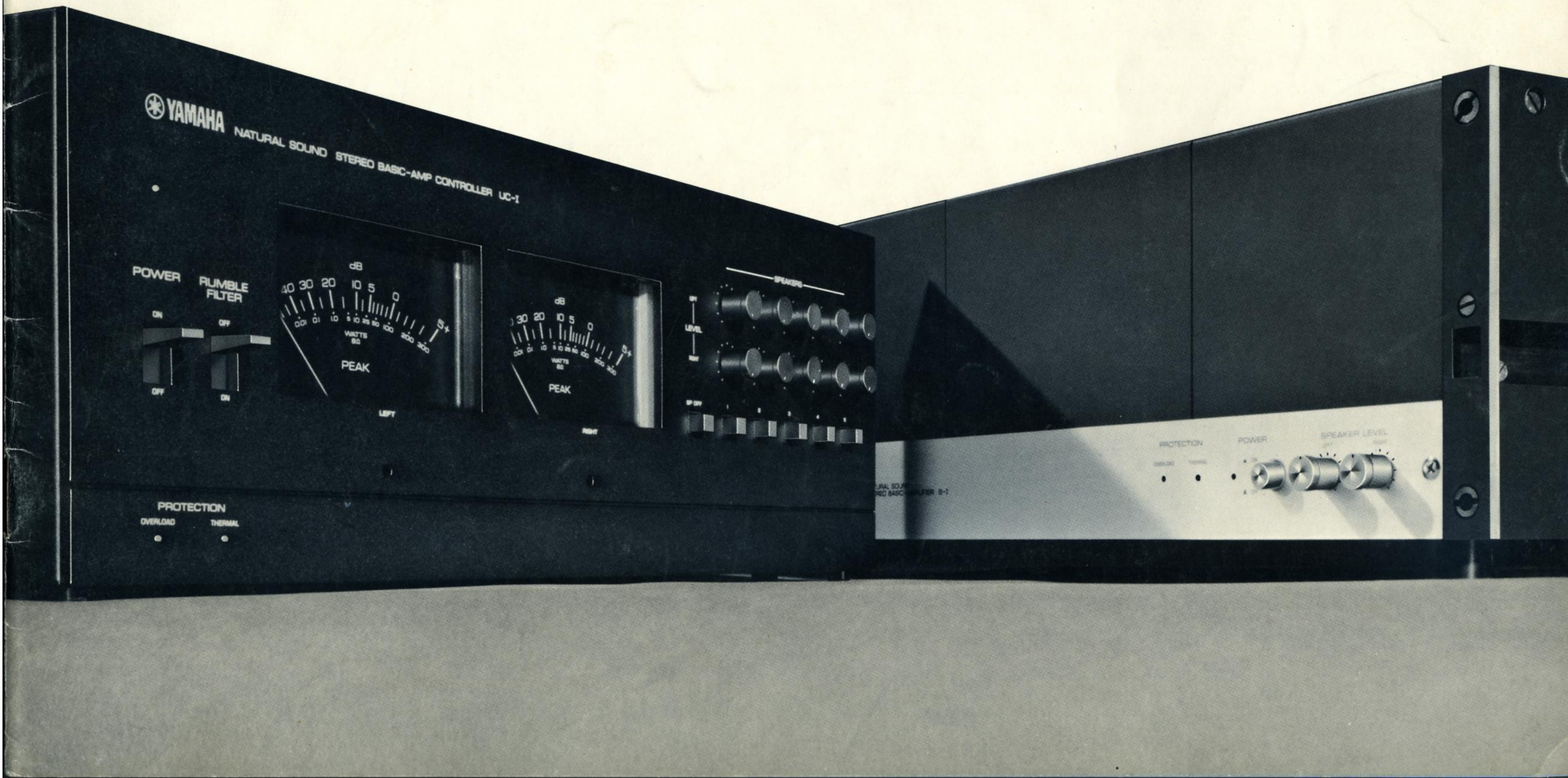
YAMAHA B-I UC-I RU-I

Owner's Manual

B-I
Super-power low distortion stereo basic amplifier with all-stage FET circuitry. Revolutionary new Yamaha vertical power FETs and SEPP OCL design.

UC-I
Control Unit with dual peak meters, separate speaker controls for five speaker sets.

RU-I
Remote control unit: five-meter connector cord, UC-I stand.



READ THIS FIRST!

You can seriously damage any stereo unit by faulty operation or connections. To avoid unnecessary expense and disappointment, be sure to read this manual carefully before attempting to operate the B-I, UC-I or RU-I.

Please bear in mind that the B-I is an extremely heavy audio component. Be sure to prepare a location sufficiently strong and stable to support it.

In selecting a location, bear in mind that the B-I produces a great deal of heat when driven at high power. Make sure there is sufficient ventilation space above and to all four sides of the cabinet. Do not place the unit near plastic products or synthetic fiber curtains, etc.

CONTENTS

The Yamaha-developed vertical FETs which comprise the power stages of the B-I are not just better than any audio element ever devised. They are so radically different that they represent the same type of breakthrough in improved performance that the coming of the transistor brought.

The B-I provides a whopping 150 watts per channel, both channels driven, throughout the entire 20 to 20,000Hz range, with a minuscule 0.1% total harmonic distortion.

This performance is due to several features:

* All-Stage FET Circuitry
  Less high-order harmonic distortion, especially the unpleasant odd-order harmonics.
* SEPP OCL Circuitry
  Cancels even-order harmonics. Uses three-stage differential amplification and source-follower symmetrical drive, easily compensates for differences in FET characteristics.
* Newly Developed Driver and Power Stage FET Biasing
  Assures extra stability, even in case of power line fluctuations.
* Class AB Operation, Large Idling Current
  Cuts crossover distortion, a problem with bipolar transistors.
* Independent Left-Right Power Sources & Transformers
  Maintain stable power during single-channel or stereo drive, or in case of sudden dynamic surges.
* Full Range of Protectors
  They make sure nothing is damaged in case of unusual operation.

UC-I, RU-I (Optional Accessories)

The UC-I is ideal for switching between as many as five separate speaker systems. It snaps onto the front of the B-I or, with the RU-I connector cord, provides remote control convenience.

UC-I Features:

* Controls for Five Sets of Speakers
  Each speaker has its own continuous level control, and any of the five sets can be selected at the flick of a switch.
* Professional Peak Meters
  Each one features a tremendous −50dB (0.001W) to +5dB (300W) range for precise output indication.

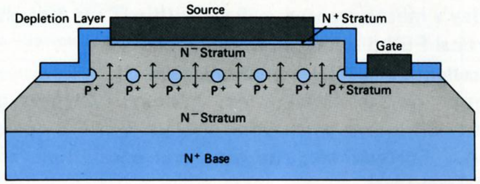
YAMAHA VERTICAL POWER FET DEVICE

THE THIRD AUDIO ERA OPENS: YAMAHA'S NEW VERTICAL FIELD EFFECT TRANSISTOR

The Yamaha B-I incorporates an entirely new type of amplifier element which offers performance characteristics excitingly superior to the bipolar transistor, with all the benefits of the triode vacuum tube. This vertical FET is a voltage-controlled element capable of handling extremely high power without fear of saturation (similar to a triode vacuum tube).

Based on an invention by Prof. J. Nishizawa of Tohoku University and the Semiconductor Research Institute, the vertical FET was developed for audio application through the joint efforts of Prof. Nishizawa's institute and Yamaha (supported by the Japan Technology Development Foundation) to refine the device. This cooperation led to a brilliant breakthrough in semiconductor research.

YAMAHA VERTICAL FET CONSTRUCTION

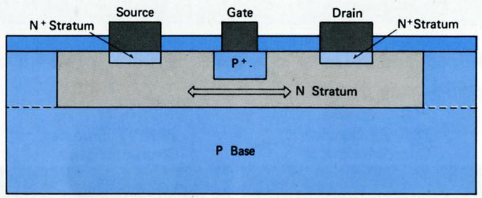


Arrows show current flow direction

As the vertical FET illustration below shows, the source, gate and drain are aligned vertically, permitting much higher power capacity. Each element of the mesh is, in effect, equivalent to an independent FET; a single Yamaha vertical FET contains tens of thousands of such elements.

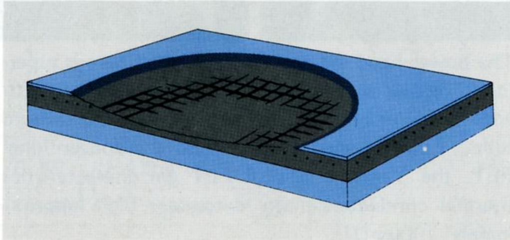
The mesh itself measures 5-10μ across. To assure highest possible drain-source and drain-gate breakdown voltage, impurity concentration is reduced to a level far below any previous semiconductors, through a special epitaxial layer formation method.

Conventional FET Construction



Arrow shows current flow direction

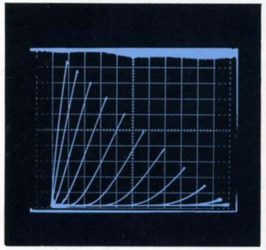
Yamaha Vertical FET Mesh Configuration



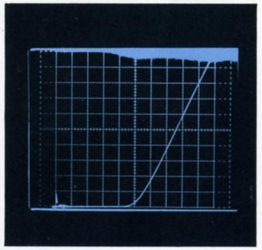
VERTICAL FET CHARACTERISTICS

Output and transfer characteristics are shown in the oscilloscope photos.

2SK-77 Output Characteristics



2SK-77 Transfer Characteristics



The power handling capacity displayed here is superior to bipolar transistors. In addition, interior resistance is ten or more times lower than in the vacuum tube. Finally, when compared to the conventional FET, the Yamaha vertical FET gm characteristics (mutual conductance) are extremely high (approximately 1000m℧).

VERTICAL FET FEATURES

When compared with the bipolar transistors used in today's most advanced audio amplifiers, the Yamaha vertical FET displays these features:

Excellent Pulse Response Characteristics
Carrier storage effect is nil, reducing switching or notch distortion when used in class B or AB operation. Furthermore, rise time and decay time are extremely fast.

Highly Linear Transfer Characteristcs
High order harmonic distortion is extremely low when compared with the bipolar transistor (which has an exponential input-output curve) due to the square characteristics.

No High Drive Power Required
The Yamaha vertical FET is a voltage-driven element, so theoretically there is no need for a power drive.

No Secondary Breakdown
Current concentration, which causes secondary breakdown in bipolar transistors, is absent in the Yamaha vertical FET. As long as the gate bias is correct, extreme strength is assured.

No Thermal Runaway
As the vertical FET temperature rises, current actually decreases, so there is no chance of thermal runaway.

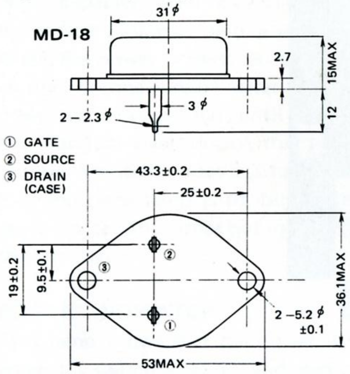
In other words, the Yamaha research team took an idea which was excellent in theory and developed it into a superb audio amplifier element. The Yamaha vertical FET boasts highly linear characteristics (thanks to its ultra-low impurity concentration), huge power-handling capacity, outstanding thermal stability, low gate leak current and many other performance elements which defy measurement but affect tone quality.

YAMAHA VERTICAL FET 2SK77/2SK75 CHARACTERISTICS

SILICON N CHANNEL VERTICAL JUNCTION FET FEATURES

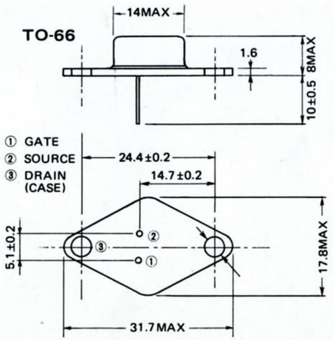
● 2SK-77

- High Voltage .... >200V
- High Transconductance........ 1500m℧
- Triode-like Characteristics
- Low Output Impedance 5Ω
- High Power Capability 200WΩ



● 2SK-75

- High Voltage .... >200V
- High Transconductance .... 30m℧
- Triode-like Characteristics
- Low Output Impedance........ 1.3KΩ

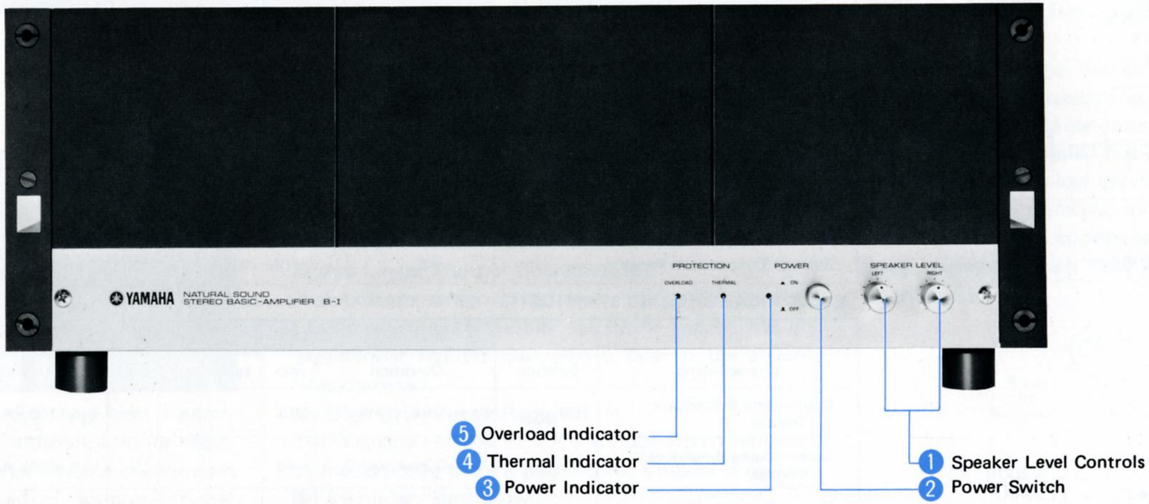


MAXIMUM RATING (Ta = 25°C unless otherwise noted)

RATING	SYMBOL	2SK77 VALUE	2SK77 UNIT	2SK75 VALUE	2SK75 UNIT
Drain – Gate Voltage	V_{DGO}	200	V	200	V
Gate – Source Voltage	V_{GSO}	–40	V	–30	V
Drain Current	I_D	20	A	500	mA
Gate Current	I_G	21	A	10	mA
Dissipation Power (Tc = 25°C)	P_D	200	W	20	W
Junction Temperature	T_j	150	°C	150	°C
Storage Temperature Range	T_{stg}	–55 ~ 150	°C	–55 ~ 150	°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

Characteristic	Symbol	2SK77 Condition	min	typ	max	unit	2SK75 Condition	min	typ	max	unit
Drain – Gate Breakdown Voltage	BV_{DGO}	I_G=–1mA, I_S=0	200			V	I_G=–100μA, I_S=0	200			V
Gate – Source Breakdown Voltage	BV_{GSO}	I_G=–0.2mA, I_D=0	–40			V	I_G=–100μA, I_D=0	–35			V
Drain – Gate Leakage Current	I_{DGO}	V_{DG}=100V, I_S=0		1	100	μA	V_{DG}=100V, I_S=0			1	μA
Gate Leakage Current	I_{GSS}	V_{GS}=–30V, V_{DS}=0		–1	–100	μA	V_{GS}=–30V, V_{DS}=0			–1	μA
Drain Current	I_{DSS}	V_{DS}=10V, V_{GS}=0		8		A	V_{DS}=5V, V_{GS}=0	10	50		mA
Gate – Source Cutoff Voltage	$V_{GS}(off)$	V_{DS}=100V, I_D=1mA			–25	V	V_{DS}=100V, I_D=100μA		–6	–16	V
Forward Transconductance	y_{fs}	V_{DS}=30V, I_D=2A, f=1kHz		1.5		℧	V_{DS}=80V, I_D=10mA, f=1kHz		30		m℧
Voltage Amplification factor	μ			7.5					40		
Drain Resistance	r_D			5		Ω			1.3		kΩ
Input Capacitance	Ciss	V_{DS}=0, V_{GS}=–10V, f=1MHz		3000		pF	V_{DS}=0, V_{GS}=–10V, f=1MHz		180		pF
Feedback Capacitance	Cr	V_{DG}=50V, I_S=0, f=1MHz		300		pF	V_{DG}=50V, I_S=0, f=1MHz		18		pF

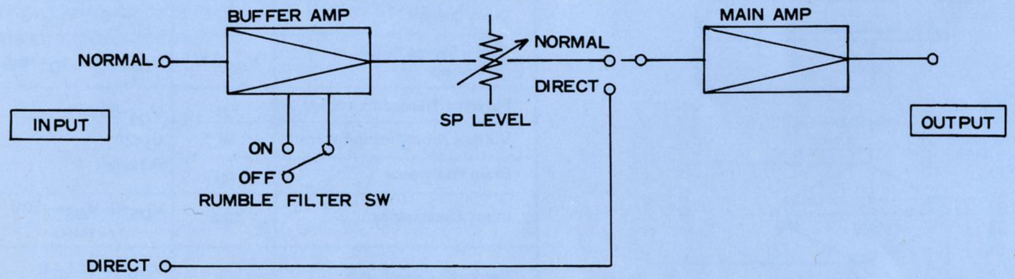


1 SPEAKER LEVEL CONTROLS

These knobs can be used to control the level of all signals received via the input jacks when the rear panel switch is set to Normal. Input sensitivity can be controlled between 0.775V and 6.0V. When the rear panel switch is set to Direct, these controls do not function.

When using a preamplifier with less than 6.0V maximum output, the level controls should be set as near to maximum as possible. With this type of preamplifier, adjusting the speaker level controls can lead to sound distortion.

Input Terminal Block Diagram



❷ POWER SWITCH

Push once for On, once again for Off.

This switch is different from other power amplifiers in that it activates another switch with much larger capacity, via a relay circuit. This permits the button to operate with a very light touch.

When the power is switched on, the speaker protection muting circuit takes over and cuts the power for a few seconds until the voltage reaches the standard level; during this time there is no output. While this circuit is functioning the overload indicator lamp is lit, but during this initial warm-up period it does not indicate a problem in the circuitry.

❸ POWER INDICATOR

This lamp shows that the power is on. It lights when the switch is set on, and goes out when it is off. When the unit is switched off, the overload indicator lamp will light momentarily; this is normal and is no cause for alarm.

❹ THERMAL INDICATOR

When this lamp lights it shows that the heat protection circuit is operating. During long periods of high-output operation a great deal of internal heat is generated. If there is a danger of any of the circuit elements heating up to 100°C (212°F), the circuit will operate and cut off the power supply; the indicator lamp will light at this time. At the same time, the speaker protection circuit will also be activated, and thus the sound will suddenly be cut off.

Once the temperature falls to a safe level, the unit will return to normal and these circuits will shut off; play will resume. However, to speed the cooling-off process, shut off the power switch for a while.

When driving a 4Ω load, even at full power, the thermal protector will not operate except in case of ventilation stoppage. If the protector does function, it indicates a need for much more effective ventilation.

❺ OVERLOAD INDICATOR

This indicator lights to show that one of the following protector circuits are operating. Note that whenever the abnormal condition is corrected, the circuit will automatically shut off again and normal operation will resume.

Speaker Protector Circuit

If a DC output (±2V) is detected at the output terminals, this circuit will immediately cancel all signals to the speakers.

Muting Circuit

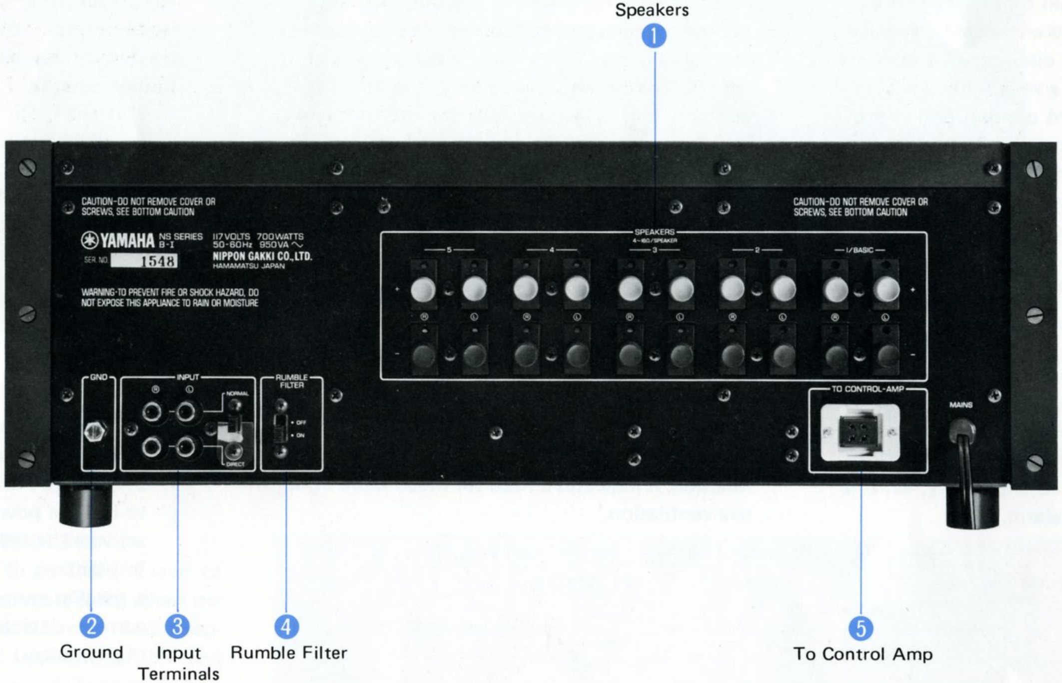
This keeps unpleasant static, etc., from passing to the speakers when the unit is first switched on.

Abnormal Voltage/Current Detector Circuit

Whenever an abnormal voltage is present in the B-I circuitry this detector circuit will operate to cut the power supply and at the same time activate the speaker protector circuit.

In addition, if abnormal current is present in a speaker output terminal (i.e., a short), the current detector circuit operates to protect the circuitry.

B-I REAR PANEL PARTS & CONNECTIONS



❶ SPEAKERS

There are five sets of speaker terminals. When the B-I is used alone, only set 1 (on the extreme right) operates. With the UC-I connected, all five terminal sets can be used.

Speakers with any impedance from 4 to 16 ohms can be connected. Be sure to use connector cords with high current capacity, to avoid danger of a short caused by thermal buildup.

To connect, first screw the terminal knob counterclockwise to open the clamp. Then insert the stripped cord end into the hole and tighten the clamp by turning the knob clockwise. Be sure to observe proper polarity in all connections.

Do not use speakers with less than 4Ω impedance. If such speakers are used, the overload protector circuit will not operate even when it should, and serious damage to the unit may occur.

❷ GROUND

Connect the GND terminal to a good ground in case of hum problems. This is not necessary if a standard preamp connection is made.

❸ INPUT TERMINALS

Connect the output cords from your preamplifier. Be sure each plug is inserted firmly into its jack; loose connections cause humming.

With the input switch set to Normal, the signal passes via the buffer amplifier (0dBm output at 0dBm input) and via the level control and rumble filter to the main amplifier. With the switch set to direct, the signal will not be affected by these controls.

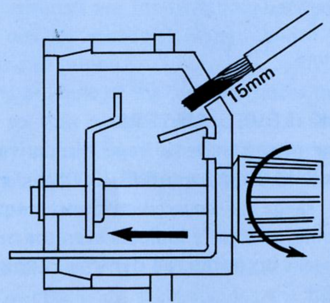
❹ RUMBLE FILTER ON-OFF SELECTOR

The buffer amplifier incorporates a rumble filter to protect the speakers against low-frequency noise from turntable rumble or warped records.

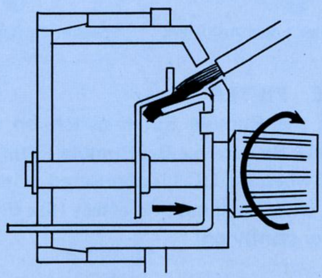
Frequency response characteristics for all three modes (Normal/Rumble filter on, Normal/Rumble filter off, Direct) are shown in the chart below.

❺ TO CONTROL AMP

This is a remote control power terminal for use with a Yamaha preamplifier C-I.

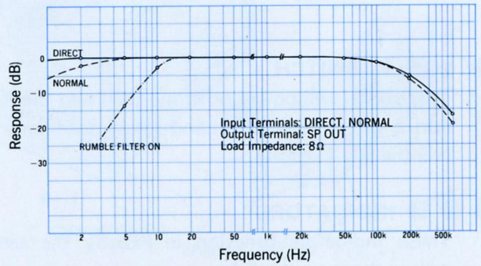


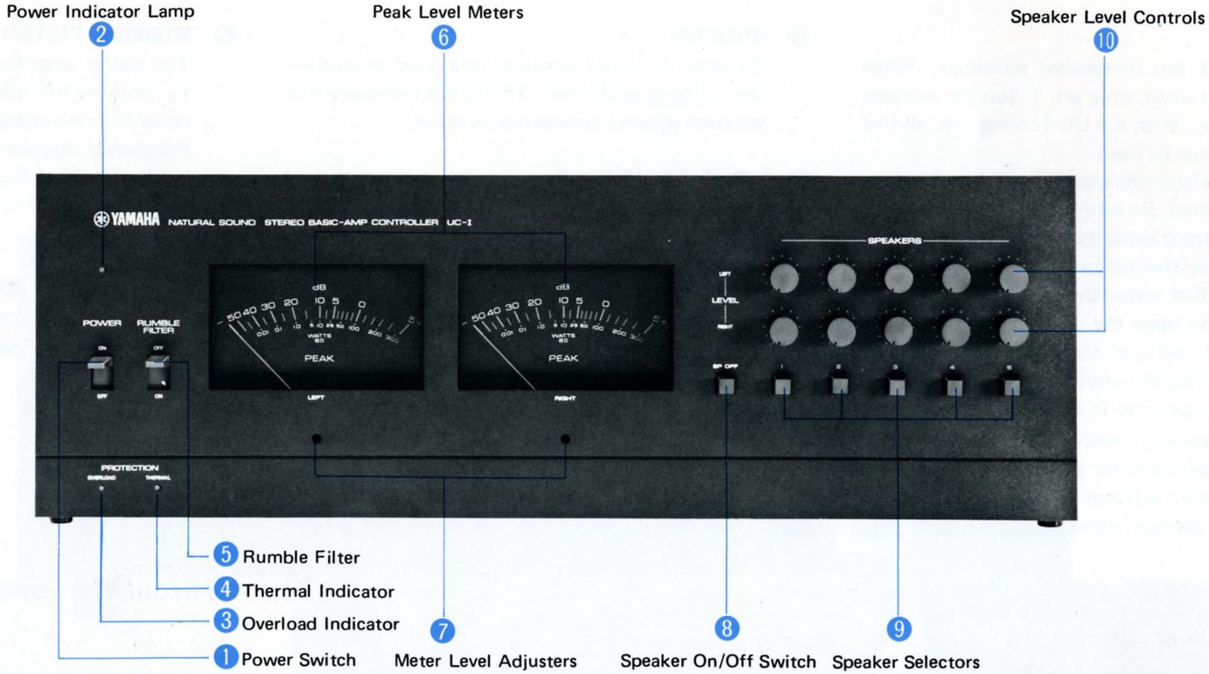
Counterclockwise



Clockwise

FREQUENCY RESPONSE CHARACTERISTICS





❶ POWER SWITCH

This switch will power both the UC-I and the B-I, during direct connection and for remote control (via the RU-I cable).

❷ ❸ ❹ INDICATORS

These indicators function in exactly the same way as those on the B-I.

❺ RUMBLE FILTER

Replaces the Rumble Filter switch on the B-I rear panel. Be sure the B-I Rumble Filter switch is set off when the UC-I is connected. Otherwise the UC-I switch will have no effect (the filter will remain constantly on).

❻ PEAK LEVEL METERS

These meters have a huge display range: from –50dB (0.001W) to +5dB (300W) signal levels. This range is covered without requiring any switches, to clearly indicate even the most powerful peaks up to the full dynamic output power of the B-I.
When an 8Ω load is connected, these meters serve as a direct power indication. When any other

load is connected, the meters indicate the power which would be produced with an 8Ω load; the operator must keep the load difference in mind when using the meters.

⑦ METER LEVEL ADJUSTERS

The meters are factory-adjusted and should require no further adjustment under ordinary operating conditions. If adjustment is required, consult your Yamaha service agent; do not attempt to adjust the meter levels yourself.

⑧ SPEAKER ON/OFF SWITCH

Press in to shut off the whole speaker circuit when you want to interrupt the sound without shutting off the power (for example, to use the level meters alone). Push once again and the button will pop out, turning on the circuit.

⑨ SPEAKER SELECTORS

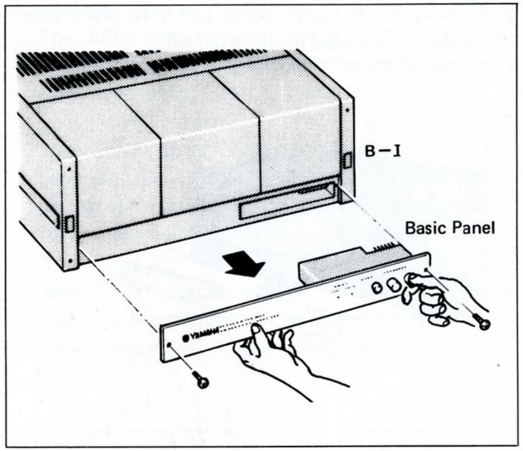
These selectors are for switching between two or more sets of speakers, which cannot be done using the B-I alone.
Pushing any one of the buttons passes the output signal to that set of speakers and, at the same time, switches off any other set (the other button will pop out). It is not possible to select more than one set at a time.

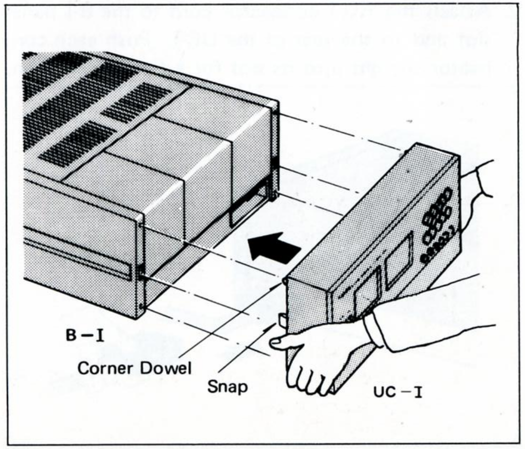
⑩ SPEAKER LEVEL CONTROLS

For low-efficiency speakers, set the controls to maximum. Adjust downward to match the efficiency of other speakers.

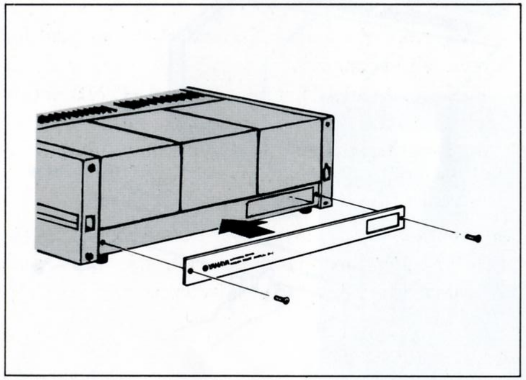
This procedure is for using the B-I and UC-I as a single unit.

1. Remove the two screws fixing the B-I front panel, then take off the basic panel.
2. Slip the back of the UC-I against the front of the B-I so that its four corner dowels mesh into the holes on the B-I cabinet. Push the two firmly together so that the built-in connector and snaps mesh.
3. Store the B-I panel safely in case you decide to use the B-I alone at a future date.

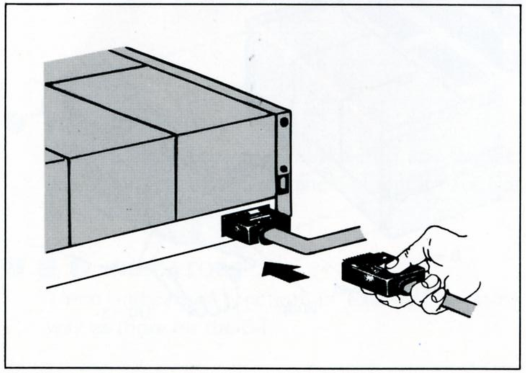




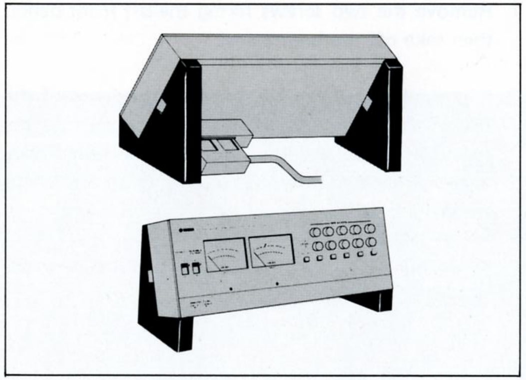
1. Remove the B-I basic panel and in its place attach the panel provided in the RU-I kit.



2. Attach the RU-I connector cord to the B-I panel slot and to the rear of the UC-I. Push each connector straight into its slot for a firm connection.



3. The RU-I stand can be used to lean the UC-I control unit at an ideal angle for easy operation.

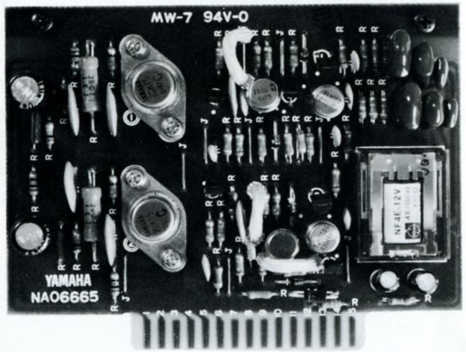


NOTE: The connector cord is specially designed to ensure low output impedance and resistance to external influences. Nevertheless, it is best to keep the cord well away from induction devices such as variable or large-size transformers, large-capacity power cords, etc.

When the UC-I is connected, either directly or via the remote control cord, the B-I controls are bypassed; the switches and knob settings have no effect PROVIDING that the B-I rear panel switch is set to Normal. If it is set to Direct, only the UC-I speaker selectors will function; the UC-I speaker volume controls will be bypassed and will not operate.
In other words, to use the UC-I, be sure the B-I rear panel switches are set in the following way:
Normal/Direct Switch: Normal
Rumble Filter Switch: Off

FILTER AMPLIFIER

This 0dB voltage gain filter amplifier is built into the B-I primary stage. This circuit works not only as a rumble filter, but also as an impedance converter to permit level control when the UC-I is connected directly or via the RU-I.



Filter Circuit Board

* **Construction**
Primary stage: a differential amplifier composed of dual Yamaha FETs.
Second stage: a source ground composed of Yamaha FETs.
Third stage: a source follower composed of Yamaha vertical FETs (drain loss: 20W).

* **Characteristics**
Input impedance: 100KΩ
Output impedance: 300Ω
Voltage gain: 0dB=1 (at 1KΩ load)
Max. output level: +18dBm (app. 6Vrms) at 0.01% THD

* **Rumble Filter**
This filter, which is operated either by the switch on the B-I rear panel or by remote control using the UC-I, is an active type with a 10Hz, −12dB/oct. cutoff frequency.

* **Features**
The 300Ω output impedance is ideal (not too high or too low), assuring virtually no signal deterioration, even when the UC-I and RU-I are used for remote level control.
The rumble filter's steep cutoff of −12dB octave beginning at 10Hz assures complete removal of ultra-low frequency sound distortions without affecting the audible frequency spectrum.

As the block diagram shows, this amplifier works only during Normal operation. When the switch is set for Direct input, this circuit is bypassed.

DRIVE AND POWER STAGE

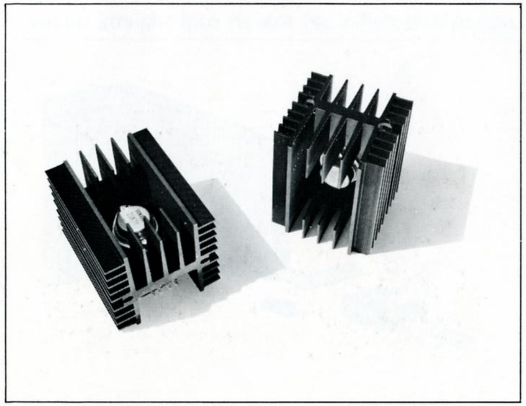
The signal line semiconductors for this all-FET amplifier circuit are Yamaha-produced field effect transistors

Circuit Construction

Primary Stage: A differential amplifier composed of dual Yamaha vertical FETs.

Second & Third Stages: Cascade-connected differential amplifiers employing Yamaha conventional and vertical FETs.

Final Stage: A Darlington-connected single-ended push-pull circuit incorporating Yamaha vertical FETs and vertical power FETs.



Primary Stage Dual FET Differential Amplifier Features

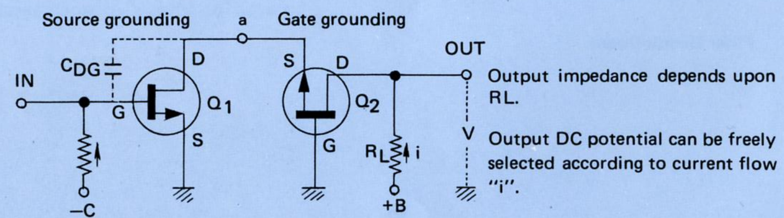
This dual FET construction assures minimum variation in IDSS characteristics; when used as a differential amplifier this provides a large common mode rejection ratio. Thus outstanding operational stability can be provided by the construction which features parallel thermal conditions.

Second & Third Stage Cascode-Connected Differential Amplifier Features

* Conventional FETs have not been able to provide high voltage handling capacity, but using this circuit higher voltage handling is possible.
* The initial stage of this circuit is connected to the source, the final stage to the gate, so the high output impedance of the initial is reduced by the final stage. Thanks to the capacitor C_{DG} between the drain and source of the initial stage FET, mirror effect and high-range signal deterioration are canceled.
* DC potential rise is sufficient for an all-stage direct coupled circuit.

Final Stage Darlington-Connected Signal-End Push-Pull Circuit Features

In a power FET a high voltage is required between the gate and source. Since this requires a special design directly connected to the previous stage, Yamaha developed a Darlington-connected circuit which assures no AC signal loss, thanks to the stable current circuit connected to the FET source of the previous stage. In this way a continuous output power of 150W (both channels driven, 20–20,000Hz, 8 ohms load, total harmonic distortion 0.1%) is assured by a single pair of Yamaha Vertical Power FETs.



POWER TRANSFORMERS

The right channel and left channel power sources are are completely separate in the B-I.
In addition, each of these transformers is guarded by a thermal protector which works with an automatic reset thermostat. In this way, no matter what the cause, excessive transformer heat build-up is prevented by the automatic shutoff.
Maximum capacity: 500VA x 2.

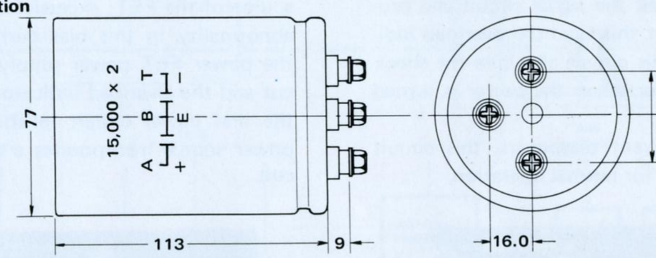
Since all other stages are connected in parallel to these two transformers, power supply is extremely stabilized.

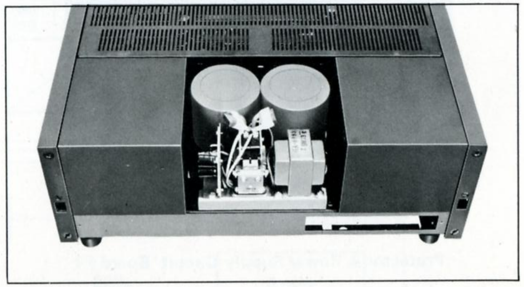
* **Power Stage Electrolytic Capacitors**
Since both channel power sources are independent, there are of course two of these high-capacity elements.

Operation Temperature Limits −25°C ~ +85°C

Terminal Mark	A	B	B	C
Nominal Static Capacity (μF)	15,000	Negative	15,000	Negative
Permissible Static Capacity Difference (%)	−20 ~ +20		−20 ~ +20	
Rated Voltage (VDC)	100		100	
Surge Voltage (VDC)	125		125	
Leak Current (less than mA)	5.00		5.00	
Permissible Ripple Current	Each element: 5.0A (at 120Hz, 85°C)			
	Each element: 15A (at 120Hz, 25°C)			

Dimensional Illustration





PROTECTOR CIRCUITS

The vertical FET is a highly reliable element, thanks to its freedom from thermal runaway and secondary destruction. For complete protection against any eventuality, however, several protector circuits have been built into the B-I. The operation of any of these circuits is indicated by the corresponding LED lamp.

*** Speaker Protector Circuit**

When ±2V DC is detected at the output terminals, the electronic DC detector circuit opens the speaker relay to break the signal circuit and protect the speaker. At this time the overload indicator will light. This circuit also cuts the shock noise which can occur when the power is turned on or off.

Once the direct current disappears, this circuit closes the relay again for normal operation.

*** Overload Protector Circuit**

When less than 4Ω impedance or a load short is present it can lead to excessive current flow. Whenever the circuit detects such excessive current it immediately shuts off the ±B power supply electronic switch which is part of each power FET circuit, protecting both the FET and the power supply circuit. Operation of the protector circuit is shown by the Overload indicator.

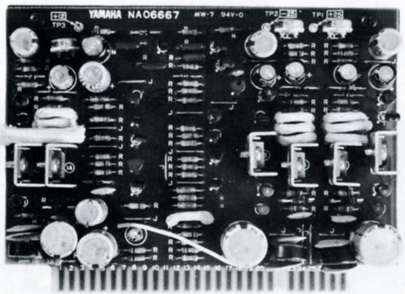
When this condition is corrected, the circuit automatically switches back on for normal operation.

*** Bias Power Supply Circuit Protector**

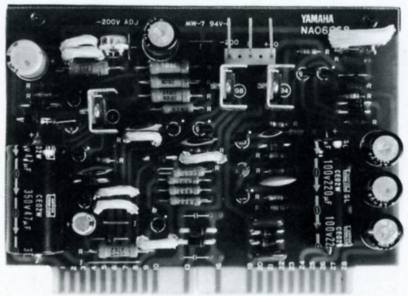
If normal bias is not supplied between the gate and source of the FET, excessive current flows. If an abnormality in this bias current supply appears, the power FET power supply ±B is immediately cut and the Overload indicator lights. To increase the bias power circuit reliability the ultra-stable power source incorporates a short protection circuit.

*** Thermal Detection Protector Circuit**

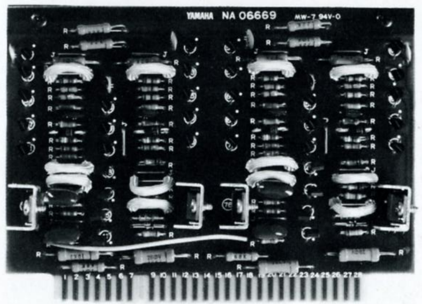
The B-I is provided with full ventilation apertures in its cabinet, but in case of excessive heat rise, the ±B power supply is shut off. The thermal detectors are built into the heat sinks, so a direct thermal reading is assured. If the heat sink temperature rises above 100°C (212°F), the protector circuit operates. At this time the Thermal and Overload indicators will light.



Protector & Power Supply Circuit Board # 1

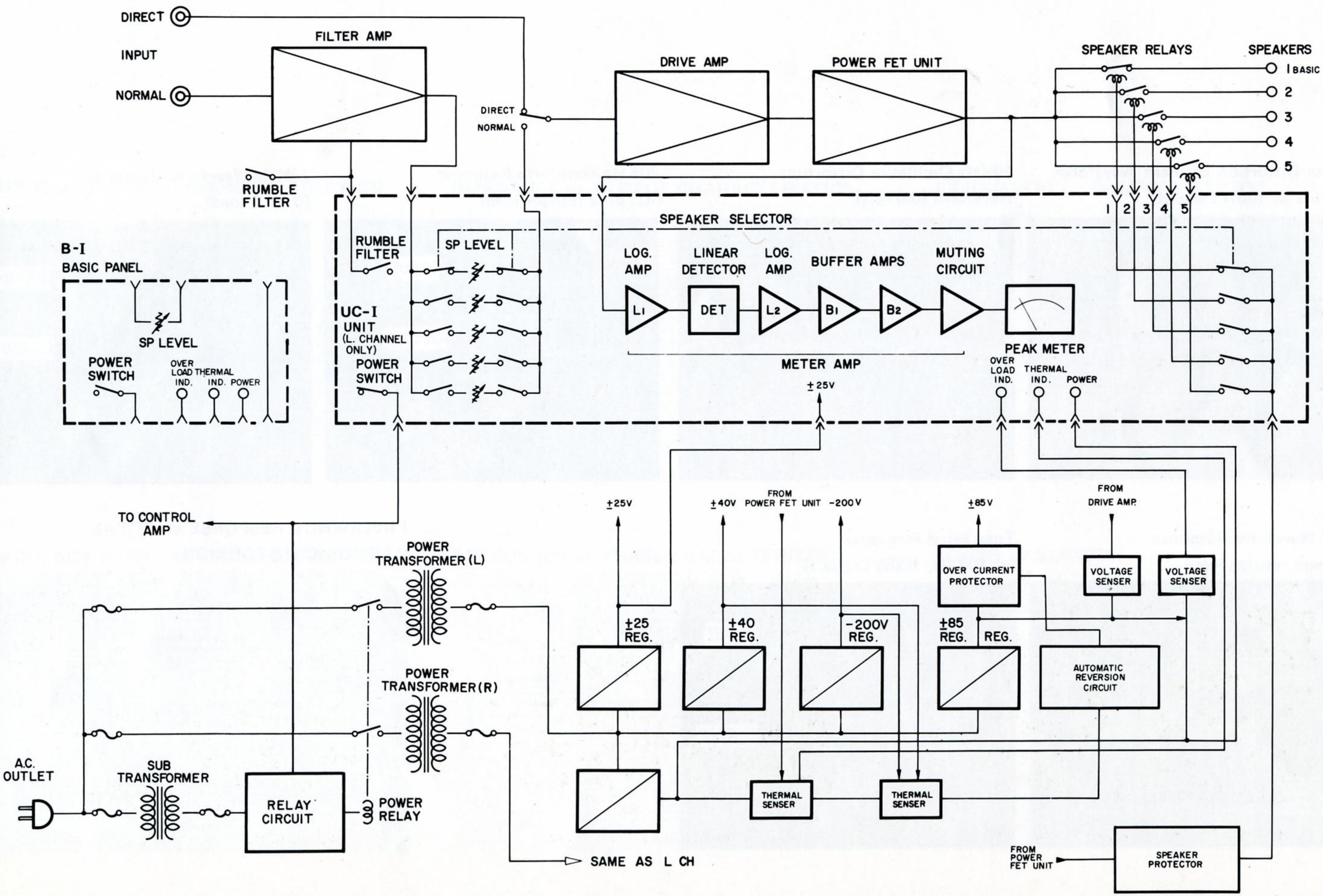


Protector & Power Supply Circuit Board # 2

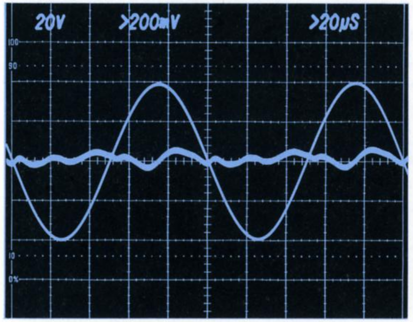


Protector & Power Supply Circuit Board # 3

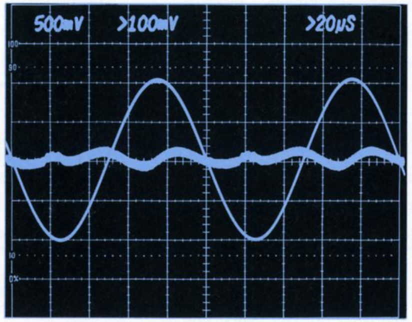
BLOCK DIAGRAM



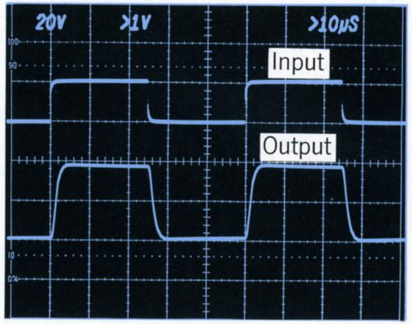
10KHz Distortion Element Waveform (0.018% at 100W Output)



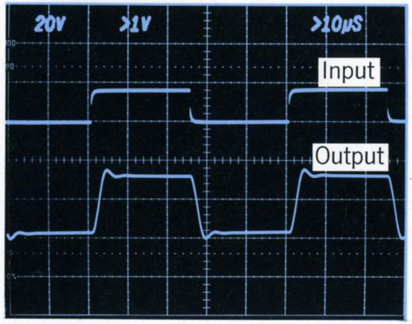
10KHz Oscillatior Distortion Waveform (0.014%)



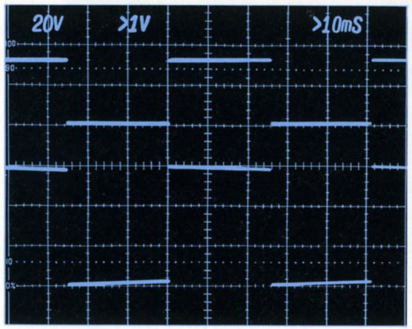
20KHz Waveform Response (8Ω pure resistor load)



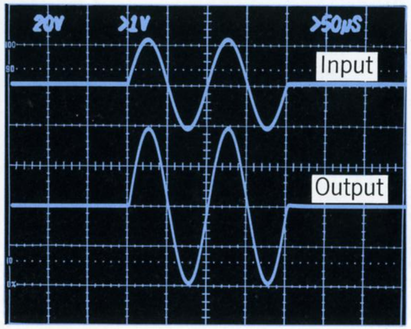
20KHz Waveform Response (0.1µF load)



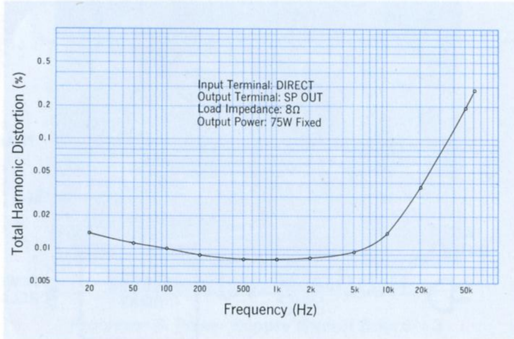
20Hz Waveform Response (8Ω pure resistor load)



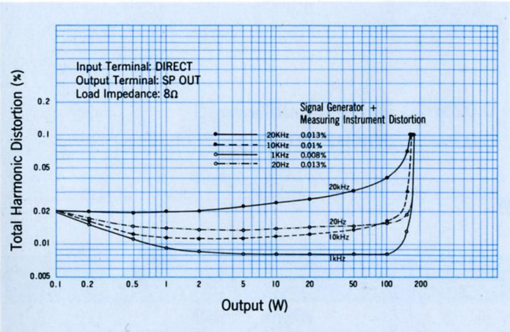
Tone Burst Response (at 10KHz, 100W Output)



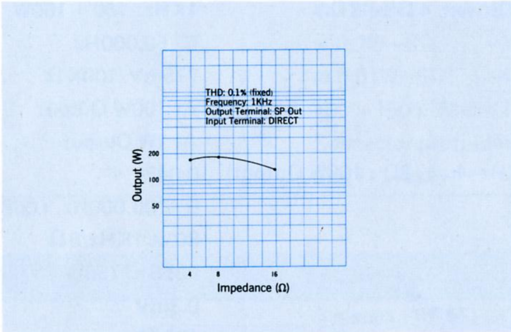
FREQUENCY RESPONSE vs. TOTAL HARMONIC DISTORTION



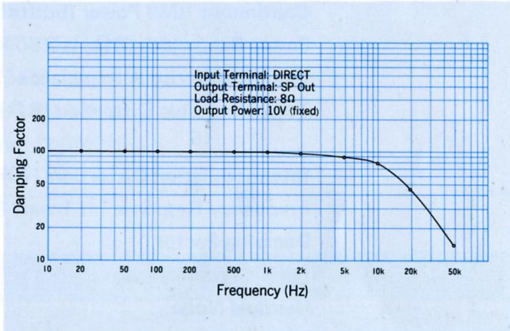
OUTPUT vs. TOTAL HARMONIC DISTORTION



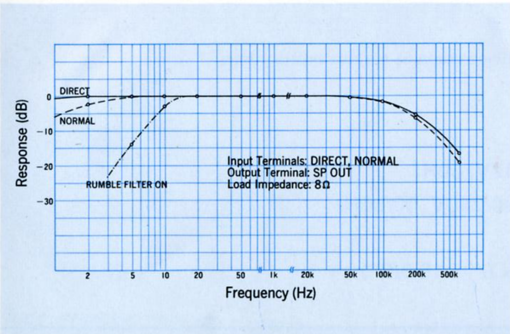
IMPEDANCE vs. OUTPUT CHARACTERISTICS



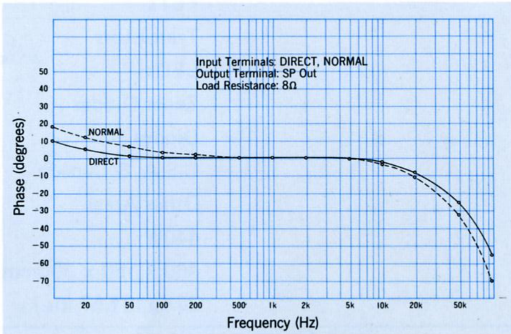
FREQUENCY vs. DAMPING FACTOR



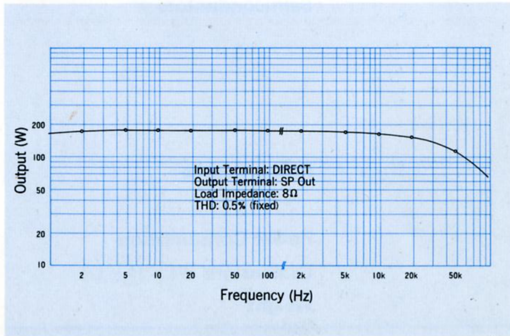
FREQUENCY RESPONSE CHARACTERISTICS



FREQUENCY vs. PHASE CHARACTERISTICS



POWER BANDWIDTH



B-I			
Min. R.M.S. Output Power per Channel	150 watts (4 or 8 ohms) from 20Hz to 20,000Hz at no more than 0.1%. Total Harmonic Distortion		
Dynamic Power (IHF)	360W (8Ω)		
Continuous RMS Power (both channels driven, 4Ω or 8Ω)	1KHz: 160 + 160W		
Power Bandwidth (8Ω, 0.5% THD)	5 - 50,000Hz		
Input Sensitivity & Impedance	775mV/100KΩ		
Total Harmonic Distortion (8Ω)	At 100W Output	1KHz: 0.02%	20KHz: 0.06%
	At 1W Output	1KHz: 0.02%	20KHz: 0.03%
Intermodulation Distortion (70Hz : 7KHz=4 : 1 8Ω, 100W Output)	0.04%		
Frequency Response (at 1 watt 8Ω)	5 - 100,000Hz, +0dB, −1dB		
Damping Factor	80 at 1KHz/8Ω		
Level Control Range	18dB (775mV-6V For Rated output)		
Residual Noise	0.3mV		
Signal-Noise Ratio	100dB		
Rumble Filter	10Hz (−12dB/oct.)		
Output Terminal Sets	1 (B-I only)	5 (with UC-I)	
Semiconductors	FETs	39	
	Transistors	113	
	LEDs	3	
	Zener Diodes	7	
	Diodes	64	
Power Source	U.S.A. & Canada	AC 117V, 60Hz	
	Other Areas	AC 220/240V 50/60Hz	
Power Consumption	440W		
Dimensions (W x H x D)	460 x 150 x 390mm (18" x 6" x 15-3/8")		
Weight	37Kg (81.57 lbs.)		

UC-I	
Meter Range	–50dB (0.001W at 8Ω) to +5dB (300W at 8Ω)
Meter Indication	at 150W–8Ω +2dB (±0.5dB)
	at 10W–8Ω –10dB (±1dB)
	at 1W–8Ω –20dB (±1dB)
	at 0.1W–8Ω –30dB (±4dB)
	at 0.01W–8Ω –40dB (±5dB)
Dimensions (W x H x D)	460 x 150 x 70mm (18" x 6" x 2-3/4")
	Connector protrudes 45mm (1-3/4")
Weight	5Kg (11 lbs.)

RU-I	
Cord Length	5 meters (16' 5")
UC-I Stand	Wood (Black lacquer Finish)

** Specifications subject to change without notice.*

SINCE 1887 YAMAHA

NIPPON GAKKI CO., LTD. HAMAMATSU, JAPAN

Printed in Japan 6.75