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**ADVANTEST**<sup>®</sup>  
ADVANTEST CORPORATION

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***R3551***  
***Preselector***  
***Operation Manual***

MANUAL NUMBER FOE-8334994D01

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## Safety Summary

To ensure thorough understanding of all functions and to ensure efficient use of this instrument, please read the manual carefully before using. Note that Advantest bears absolutely no responsibility for the result of operations caused due to incorrect or inappropriate use of this instrument.

If the equipment is used in a manner not specified by Advantest, the protection provided by the equipment may be impaired.

- **Warning Labels**

Warning labels are applied to Advantest products in locations where specific dangers exist. Pay careful attention to these labels during handling. Do not remove or tear these labels. If you have any questions regarding warning labels, please ask your nearest Advantest dealer. Our address and phone number are listed at the end of this manual.

Symbols of those warning labels are shown below together with their meaning.

**DANGER:** Indicates an imminently hazardous situation which will result in death or serious personal injury.

**WARNING:** Indicates a potentially hazardous situation which will result in death or serious personal injury.

**CAUTION:** Indicates a potentially hazardous situation which will result in personal injury or a damage to property including the product.

- **Basic Precautions**

Please observe the following precautions to prevent fire, burn, electric shock, and personal injury.

- Use a power cable rated for the voltage in question. Be sure however to use a power cable conforming to safety standards of your nation when using a product overseas.
- When inserting the plug into the electrical outlet, first turn the power switch OFF and then insert the plug as far as it will go.
- When removing the plug from the electrical outlet, first turn the power switch OFF and then pull it out by gripping the plug. Do not pull on the power cable itself. Make sure your hands are dry at this time.
- Before turning on the power, be sure to check that the supply voltage matches the voltage requirements of the instrument.
- Connect the power cable to a power outlet that is connected to a protected ground terminal. Grounding will be defeated if you use an extension cord which does not include a protected ground terminal.
- Be sure to use fuses rated for the voltage in question.
- Do not use this instrument with the case open.
- Do not place anything on the product and do not apply excessive pressure to the product. Also, do not place flower pots or other containers containing liquid such as chemicals near this

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## Safety Summary

product.

- When the product has ventilation outlets, do not stick or drop metal or easily flammable objects into the ventilation outlets.
- When using the product on a cart, fix it with belts to avoid its drop.
- When connecting the product to peripheral equipment, turn the power off.

- **Caution Symbols Used Within this Manual**

Symbols indicating items requiring caution which are used in this manual are shown below together with their meaning.

**DANGER:** Indicates an item where there is a danger of serious personal injury (death or serious injury).

**WARNING:** Indicates an item relating to personal safety or health.

**CAUTION:** Indicates an item relating to possible damage to the product or instrument or relating to a restriction on operation.

- **Safety Marks on the Product**

The following safety marks can be found on Advantest products.



: ATTENTION - Refer to manual.



: Protective ground (earth) terminal.



: DANGER - High voltage.



: CAUTION - Risk of electric shock.

- **Replacing Parts with Limited Life**

The following parts used in the instrument are main parts with limited life.

Replace the parts listed below before their expected lifespan has expired to maintain the performance and function of the instrument.

Note that the estimated lifespan for the parts listed below may be shortened by factors such as the environment where the instrument is stored or used, and how often the instrument is used.

The parts inside are not user-replaceable. For a part replacement, please contact the Advantest sales office for servicing.

Each product may use parts with limited life.

For more information, refer to the section in this document where the parts with limited life are described.

## Main Parts with Limited Life

Part name	Life
Unit power supply	5 years
Fan motor	5 years
Electrolytic capacitor	5 years
LCD display	6 years
LCD backlight	2.5 years
Floppy disk drive	5 years
Memory backup battery	5 years

- **Hard Disk Mounted Products**

The operational warnings are listed below.

- Do not move, shock and vibrate the product while the power is turned on.  
Reading or writing data in the hard disk unit is performed with the memory disk turning at a high speed. It is a very delicate process.
- Store and operate the products under the following environmental conditions.  
An area with no sudden temperature changes.  
An area away from shock or vibrations.  
An area free from moisture, dirt, or dust.  
An area away from magnets or an instrument which generates a magnetic field.
- Make back-ups of important data.  
The data stored in the disk may become damaged if the product is mishandled. The hard disc has a limited life span which depends on the operational conditions. Note that there is no guarantee for any loss of data.

- **Precautions when Disposing of this Instrument**

When disposing of harmful substances, be sure dispose of them properly with abiding by the state-provided law.

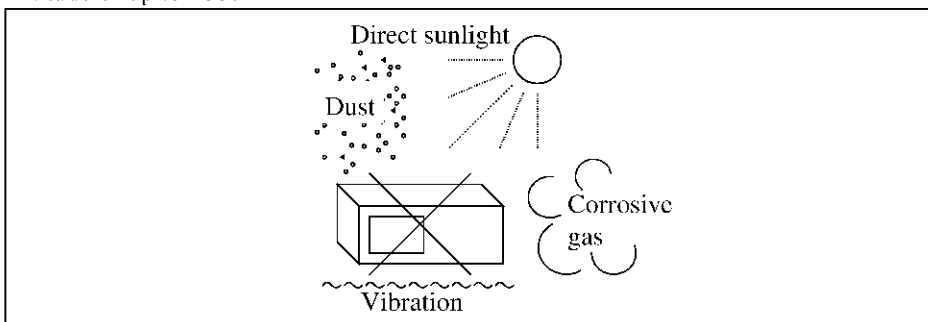
Harmful substances: (1) PCB (polycarbon biphenyl)  
(2) Mercury  
(3) Ni-Cd (nickel cadmium)  
(4) Other  
Items possessing cyan, organic phosphorous and hexadic chromium and items which may leak cadmium or arsenic (excluding lead in solder).

Example: fluorescent tubes, batteries

# Environmental Conditions

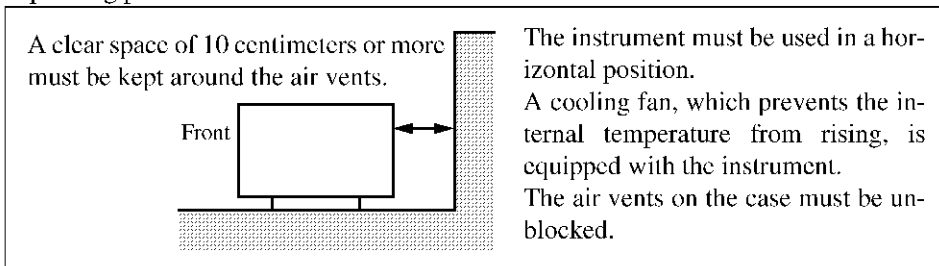
This instrument should be only be used in an area which satisfies the following conditions:

- An area free from corrosive gas
- An area away from direct sunlight
- A dust-free area
- An area free from vibrations
- Altitude of up to 2000 m



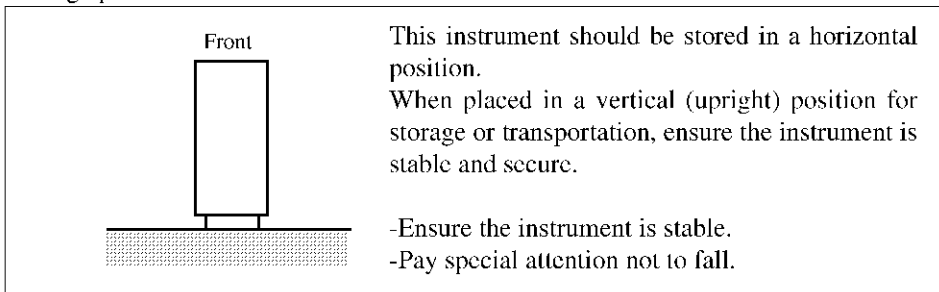
**Figure-1 Environmental Conditions**

- Operating position



**Figure-2 Operating Position**

- Storage position



**Figure-3 Storage Position**

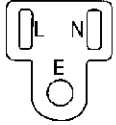
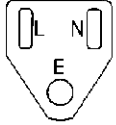
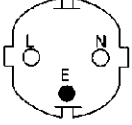
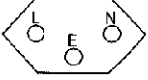
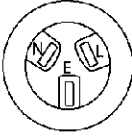

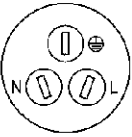
- The classification of the transient over-voltage, which exists typically in the main power supply, and the pollution degree is defined by IEC61010-1 and described below.

Impulse withstand voltage (over-voltage) category II defined by IEC60364-4-443

Pollution Degree 2

## Types of Power Cable

Replace any references to the power cable type, according to the following table, with the appropriate power cable type for your country.

Plug configuration	Standards	Rating, color and length	Model number (Option number)
	PSE: Japan  Electrical Appliance and Material Safety Law	125 V at 7 A Black 2 m (6 ft)	Straight: A01402  Angled: A01412
	UL: United States of America  CSA: Canada	125 V at 7 A Black 2 m (6 ft)	Straight: A01403 (Option 95)  Angled: A01413
	CEE: Europe DEMKO: Denmark NEMKO: Norway VDE: Germany KEMA: The Netherlands CEBEC: Belgium OVE: Austria FIMKO: Finland SEMKO: Sweden	250 V at 6 A Gray 2 m (6 ft)	Straight: A01404 (Option 96)  Angled: A01414
	SEV: Switzerland	250 V at 6 A Gray 2 m (6 ft)	Straight: A01405 (Option 97)  Angled: A01415
	SAA: Australia, New Zealand	250 V at 6 A Gray 2 m (6 ft)	Straight: A01406 (Option 98)  Angled: -----
	BS: United Kingdom	250 V at 6 A Black 2 m (6 ft)	Straight: A01407 (Option 99)  Angled: A01417
	CCC: China	250 V at 10 A Black 2 m (6 ft)	Straight: A114009 (Option 94)  Angled: A114109

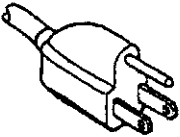
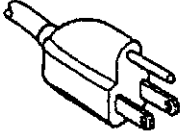
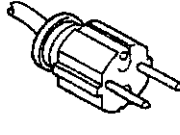
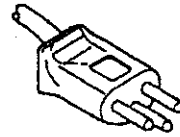
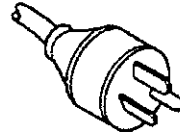
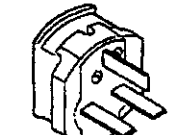




## Table of Power Cable Options

There are six power cable options (refer to following table).

Order power cable options by Model number.

	Plug configuration	Standards	Rating, color and length	Model number (Option number)
1		JIS: Japan Law on Electrical Appliances	125 V at 7 A Black 2 m (6 ft)	Straight: A01402 Angled: A01412
2		UL: United States of America CSA: Canada	125 V at 7 A Black 2 m (6 ft)	Straight: A01403 (Option 95) Angled: A01413
3		CEE: Europe DEMKO: Denmark NEMKO: Norway VDE: Germany KEMA: The Netherlands CEBEC: Belgium OVE: Austria FIMKO: Finland SEMKO: Sweden	250 V at 6 A Gray 2 m (6 ft)	Straight: A01404 (Option 96) Angled: A01414
4		SEV: Switzerland	250 V at 6 A Gray 2 m (6 ft)	Straight: A01405 (Option 97) Angled: A01415
5		SAA: Australia, New Zealand	250 V at 6 A Gray 2 m (6 ft)	Straight: A01406 (Option 98) Angled: -----
6		BS: United Kingdom	250 V at 6 A Black 2 m (6 ft)	Straight: A01407 (Option 99) Angled: A01417



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PRESELECTOR  
OPERATION MANUAL

Preface

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PREFACE

The R3551 preselector (hereafter called this equipment) is used by connecting to the R3261A/B, R3361A/B spectrum analyzer. Refer to this operation manual together with the operation manual of the R3261/3361 series spectrum analyzer.



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1.1 Outline

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1. GENERAL

1.1 Outline

The R3551 preselector (hereafter called this equipment) has a band pass filter to cover the frequency band of 9 kHz through 1 GHz. The spectrum analyzers that match this equipment follow: R3261A, R3261B, R3361A, and R3361B, for a total of four models. By operating this equipment connected to a spectrum analyzer, the following advantages may be gained:

- Distortion is reduced to the wide band large input signal.
- By means of a built-in overload detector, protects the spectrum analyzer against any electrical shock breakdown due to a large signal input.

Distortion can be easily checked using the linearity check function of 3 dB. Electromagnetic wave interference (EMI), highly sensitive measurement can be done using the preamplifier of 30 dB that is incorporated.

[Features]

- The through filter of this equipment is automatically linked with the sweep frequency of the spectrum analyzer to operate. Setting of this equipment frequency band is not necessary.
- When this equipment is connected to the spectrum analyzer, total frequency characteristic is  $\pm 2.0$  dB, so accurate measuring can be done.
- This equipment incorporates an overload detector to protect the spectrum analyzer against a signal of approx. +20 dBm or more.
- Since gain of the preamplifier is 30 dB, a minute signal or noise can be easily measured.
- Since the built-in amplifier and the attenuator of this equipment are linked with the reference level of the spectrum analyzer, the level can be read directly.
- Since a linearity check function of 3 dB is built-in, saturation of the spectrum analyzer can easily be checked.

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1.2 Preparations Before Starting

1.2 Preparations Before Starting

1.2.1 Check of Attachments

Upon receipt of this equipment, run checks thereon as shown below.

- ① Run visual checks against any and all damages or imperfections.
- ② Check the quantity and rating of standard attachments to assure their conformance with Table 1-1.

In the event of any damage, missing standard attachment, or equivalent, contact a nearby sales office, or your dealer.

Table 1 - 1 Standard Attachments

	Product name	Model	Stock No.	Q'ty	Remarks
1	Power supply cable	MP-43B	DCB-DD2428X01	1	
2	Power supply adaptor	KPR-18	JCD-AL003EX03	1	
3	Conversion connector	JUG-201A/V	JCF-AF001EX03	2	
4	Connecting cable	57FE-324-201W	DCB-RR1779X01	1	Control
5		MI-78	DCB-FF0981X03	1	RF
6		---	DCB-FF0981X02	1	RAMP
7	Power supply fuse	MDL-1A	DFT-AH1A	2	90 VAC to 132 VAC
		MDL-0.5A	DFT-AHR5A		180 VAC to 250 VAC
8	Operation manual	---	JR3551	1	Japanese
			ER3551		English

Request to User: When ordering add-on attachments and the like, be good enough to stipulate the model (or stock No.) concerned.

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1.2 Preparations Before Starting

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1.2.2 Environmental Usage Conditions and Cautions

(1) Temperature

To operate this equipment as specified in the specifications, use the equipment within the temperature range of 0°C to +50°C and relative humidity of 85% or less.

(2) Setting Place

Because this equipment is a precision measuring instrument, it must not be used in a dusty place or where there is much vibration, a place where there is direct sun light, a place where there is corrosive gas, or a place where mechanical shocks will occur such as on an unstable dolly.

(3) Warm up

To satisfy the measuring accuracy, be sure to warm up for 30 minutes or more.

(4) Connection with spectrum analyzer

This equipment has been compensated in the condition of combination with spectrum analyzer (main unit) delivered together. Use this equipment with the main unit of initial delivery to perform specifications.

1.2.3 Power Supply, Ground and Fuse

(1) Power Supply Used

For the power source, 100 VAC  $\pm 10\%$  (changeable to 120, 220, or 240 VAC with option), and power supply frequency from 48 Hz to 66 Hz are used. Be sure to use the attached power supply cable.

CAUTION

Before connecting the power supply cable, be sure to turn off the power switch in prior to connecting.

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1.2 Preparations Before Starting

(2) Power Supply Cable

The plug of the power supply cable is 3-pin. The central round pin is for the earth, and is grounded when connecting the pin to a 3-pin plug socket. To protect against electric shock, be sure to ground. When the pin can not be connected to a 3-pin plug socket, use attached adapter A09034 (KPR-18), and be sure to connect either the earth line from the adapter [See Figure 1-1 (a)] or the earth terminal located on the rear panel of the main frame to the external earth line to ground.

The attached adapter is based on the regulations on electric products. As shown in Figure 1-1 (b), since width A and B of two electrodes of the adapter of this A09034 (KPR-18) are different, when the adapter is inserted into the plug socket, check the directions of the plug and the socket before connecting.

When A09034 (KPR-18) can not be connected to the plug socket used, use adaptor KPR-13, which is sold separately.

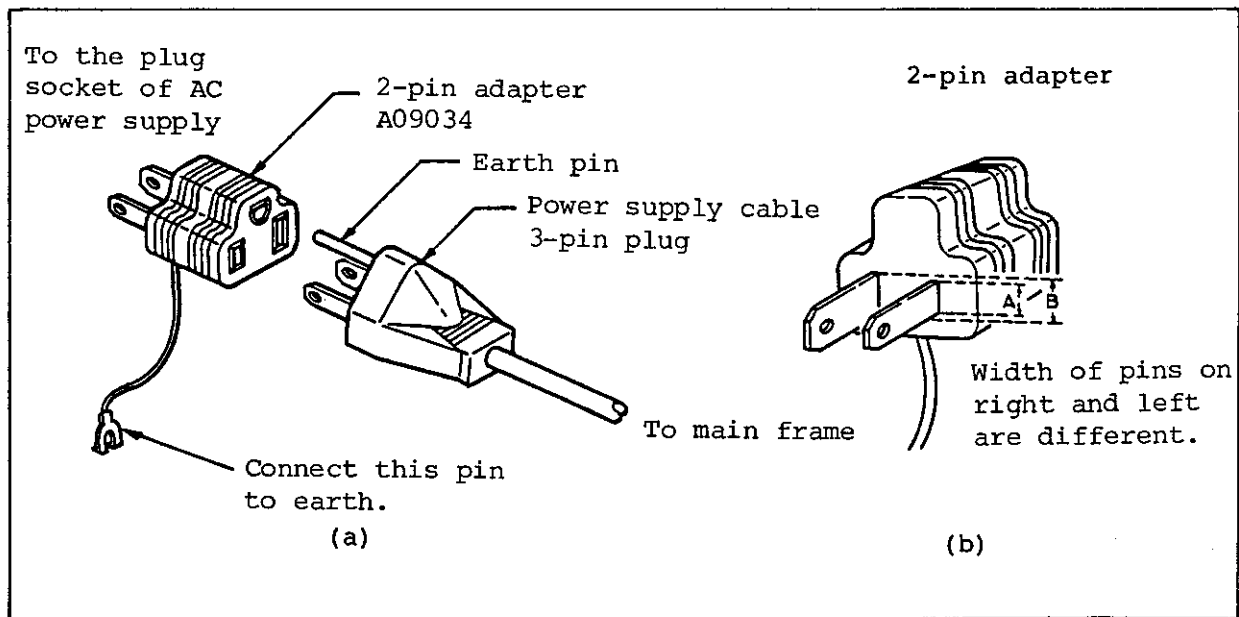


Figure 1 - 1 Plug and Adapter of Power Supply Cable

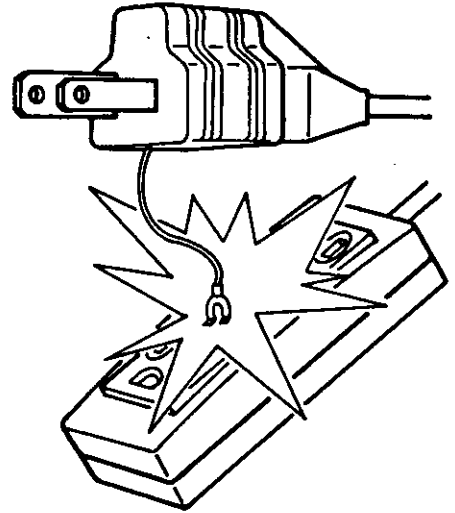
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1.2 Preparations Before Starting

CAUTION

When the earth line coming from the adapter is connected, do not to let it contact the live line (AC LINE).

If the earth line makes contact with the live line by mistake, this equipment and other equipment may be damaged.



(3) Fuse

Before replacing the fuse, remove the power supply cable from the AC LINE connector. The power supply fuse is stored in the fuse holder located on the rear panel.

Since the fuse rating is different depending on the voltage, be sure to replace the fuse with one of the correct rating.

Table 1 - 2 Fuse ratings

Power Supply Voltage	Model	Stock No.
90 VAC to 132 VAC	MDL-1A	DFT-AH1H
180 VAC to 250 VAC	MDL-0.5A	DFT-AHR5A

Voltage setting card

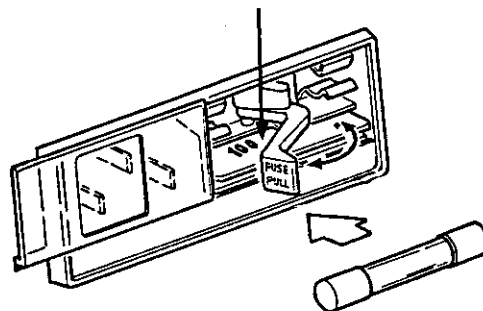


Figure 1 - 2 Method of Replacing Fuse and Voltage Setting Card





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2. EXPLANATION OF EQUIPMENT PANELS

2. EXPLANATION OF EQUIPMENT PANELS

Explanations of keys and terminals on the front panel and the rear panel.



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2.1 Explanation of Front Panel

2.1 Explanation of Front Panel

The front panel parts identification and description are given below. You are requested to digest them by referring to [Fig. 2-1].

Parts Description

- ① POWER switch : This is a toggle switch. This switch turns the power on/off.
- ② PANEL LOCK key : When this equipment is controlled externally by GPIB, input from the panel is invalid. In this case, if this key is pressed, panel key input becomes possible.
- ③ BAND Hz key : Sets the pass band width. (9 kHz to 1 GHz) When connected to spectrum analyzer, the most suitable band is automatically set.
- ④ BYPASS key : This key is used to have signals bypass this equipment without entering any of its internal circuits. The LED lights in bypass condition. When this key is pressed again, the bypass mode is canceled.
- ⑤ LIN CHECK (3 dB) key: By pressing this key, the attenuator of 3 dB is turned on. When pressed again, the attenuator is turned off. This key is used to check of torsion and so on.
- ⑥ PRE AMP : This is the ON/OFF key of the preamplifier of 30 dB.
- ⑦ OVERLOAD RESET key : When a signal of +25 dBm or more is input to this equipment, the overload detector circuit works and the input signal is separated. Press this key after removing the overload condition. The circuit will be reset.
- ⑧ ⑨ INPUT ATT key : By pressing this key, the input attenuator is increased or decreased. When 8 is pressed, the input attenuator decreases in 10 dB steps. When 9 is pressed, the attenuator increases in 10 dB steps.
- ⑩ OUTPUT 50 Ω connector : Output terminal
- ⑪ INPUT 50 Ω 10 kHz to 1 GHz connector : Input terminal

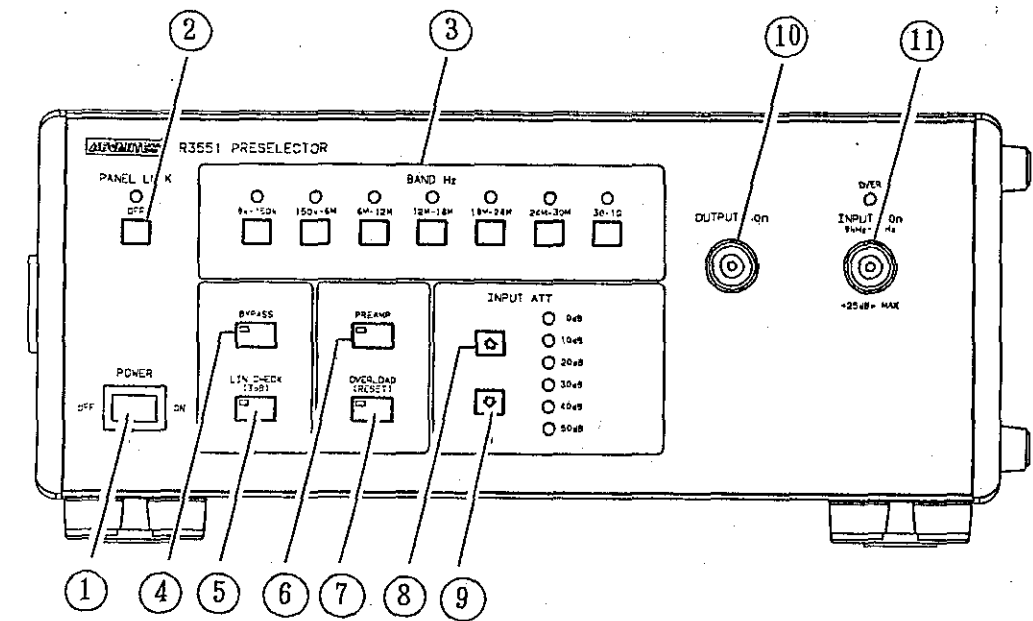


Figure 2 - 1 Explanation of Front Panel

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2.2 Explanation of Rear Panel

2.2 Explanation of Rear Panel

The rear panel parts are described below. You are requested to digest them by referring to [Fig. 2-2].

Parts Description

- ① CONTROL connector : The control signal of the spectrum analyzer is input from this terminal.
- ② RAMP IN connector : This is the terminal where the sweep signal is input from the spectrum analyzer.
- ③ GND connector : Ground terminal
- ④ Power supply connector

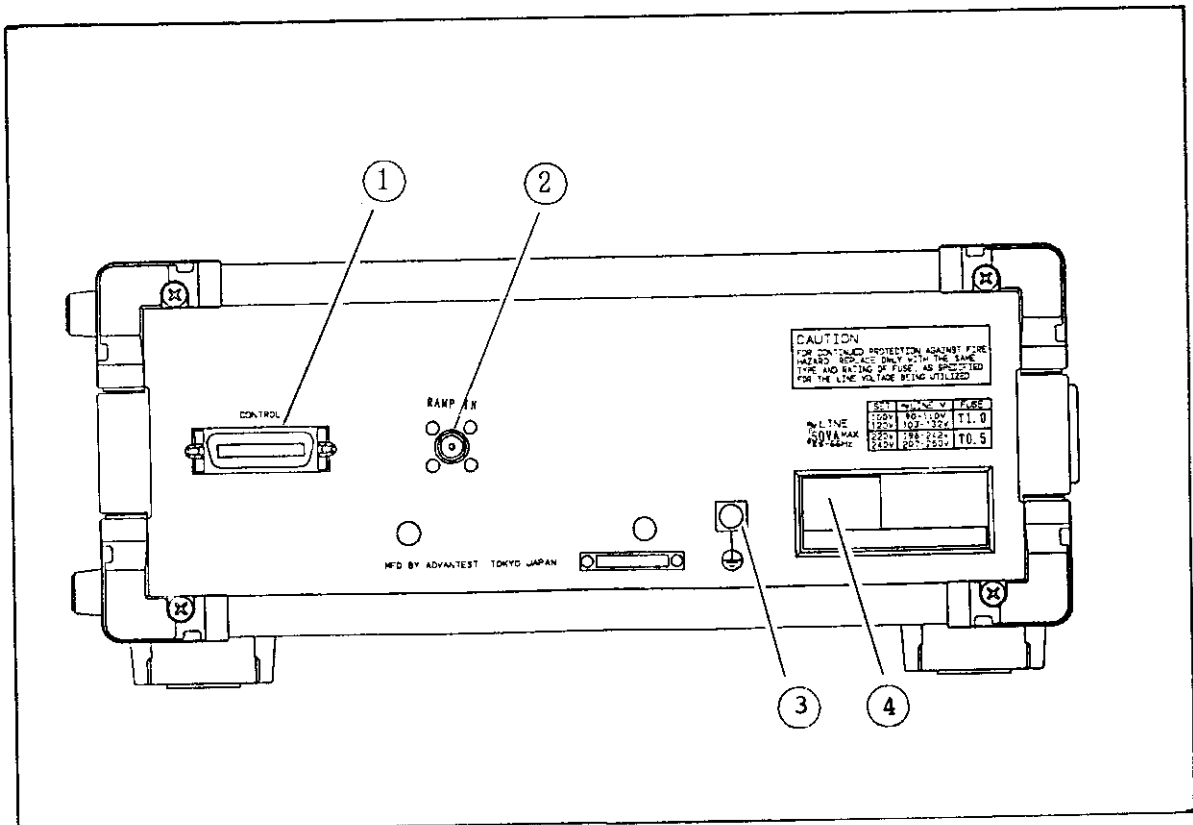


Figure 2 - 2 Explanation of Rear Panel



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3.1 Connecting Procedure

3. OPERATION PROCEDURE

This chapter describes the spectrum analyzer connecting procedure and test methods.

3.1 Connecting Procedure

3.1.1 Connecting of Front Panel

To connect this equipment with the front panel of a spectrum analyzer, follow the steps below.

Connecting Steps

- ① Position the spectrum analyzer on top of this equipment.
- ② Connect connector [OUTPUT 50Ω] of this equipment with connector [INPUT 50Ω] of the spectrum analyzer.

Use "JCF-AF001EX07" for the matching connector.  
Use "DCB-FF0981X01" for the connecting cable.

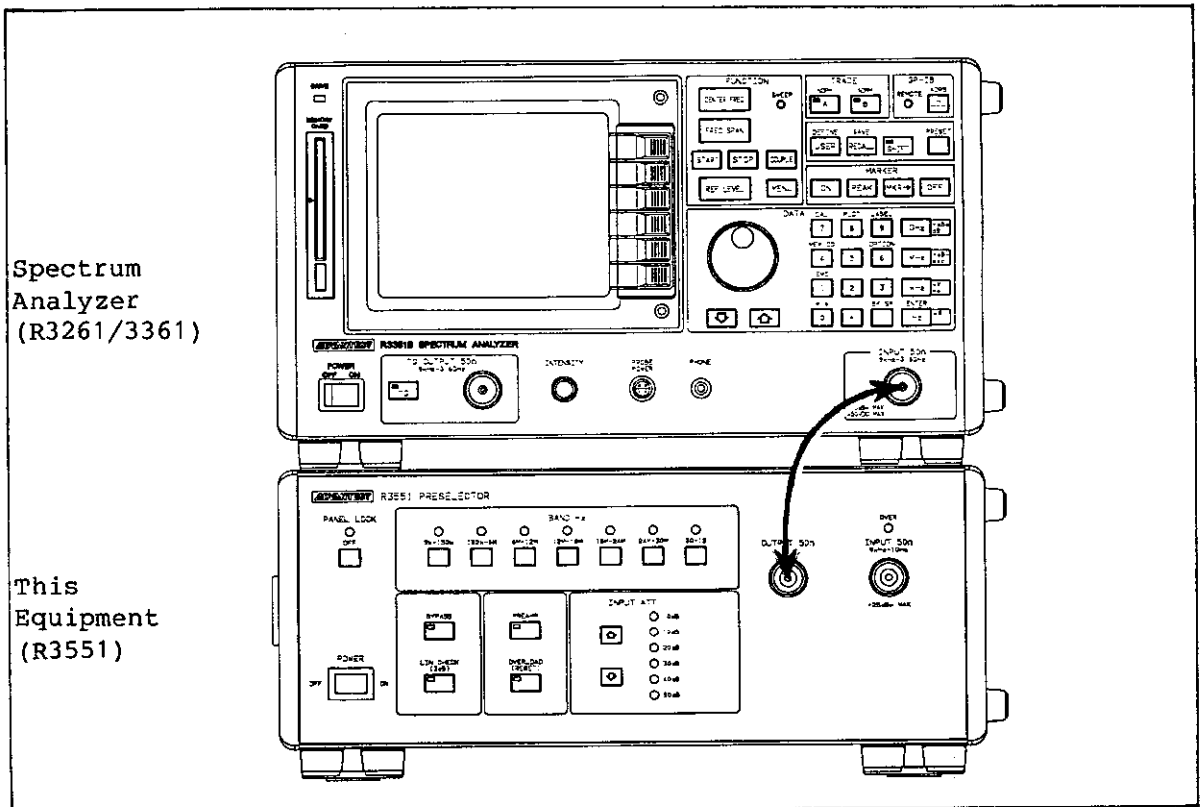


Figure 3 - 1 Connecting of Front Panel

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3.1 Connecting Procedure

3.1.2 Connecting of Rear Panel

To connect this equipment with the rear panel of a spectrum analyzer, follow the steps below.

Connecting Steps

- ① Position the spectrum analyzer on top of this equipment.
- ② Connect connector [CONTROL] of this equipment with connector [PARALLEL I/O] of the spectrum analyzer.

For the connecting cable, use "DCB-RR1779X01".

- ③ Connect connector [RAMP IN] of this equipment with connector [2V/nGHz] of the spectrum analyzer.

For the connecting cable, use "DCB-FF0981X02".

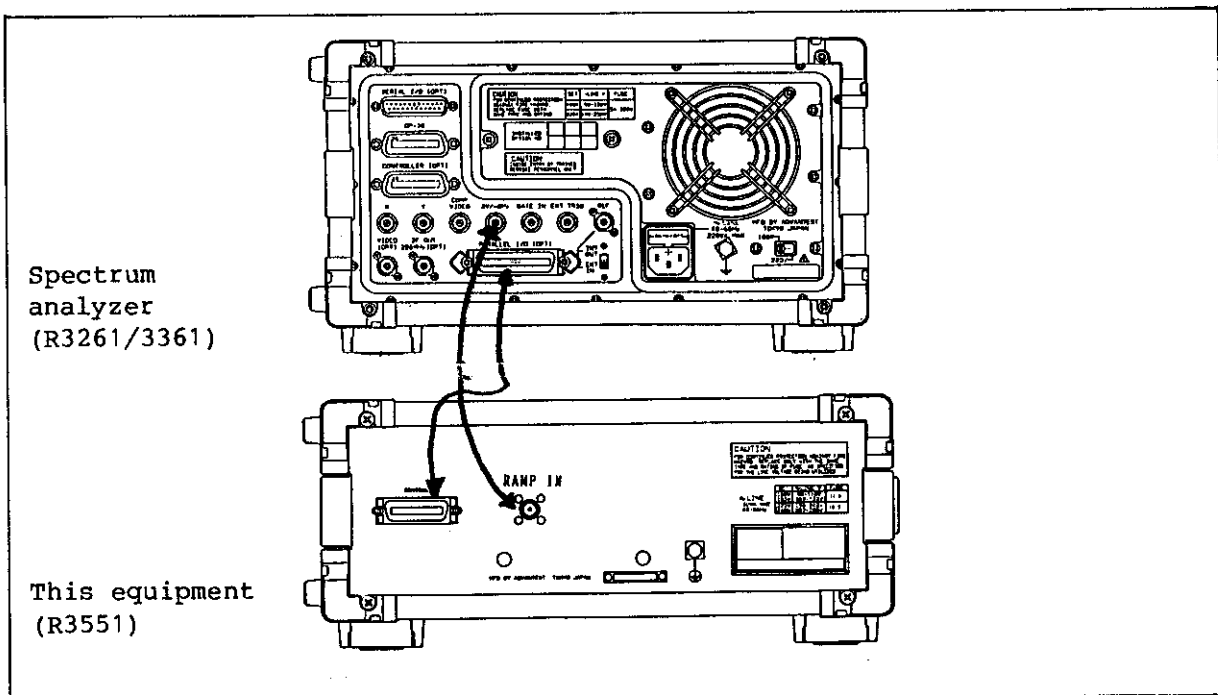


Figure 3 - 2 Connecting of Rear Panel

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3.2 Measuring Procedure

3.2 Measuring Procedure

Procedure

- ① Connect this equipment with a spectrum analyzer in conformance with [3.1 Connecting procedure].
- ② Each power supply switch is turned on.  
In the power on condition (Initialization), since the attenuator of this equipment is connected to 10 dB, it is the same as when OFFSET of 10 dB is input spectrum analyzer. For the preamplifier of this equipment, OFF is selected.
- ③ A signal input entering the input terminal of this equipment passes through filters within, and eventually is input to the input terminal of the spectrum analyzer.
- ④ When the input signal is small, set the PRE AMP key of this equipment to ON.
- ⑤ To check against any saturation in a large signal input mode, push the LIN CHECK (3 dB) key and see if the input signal level varies for 3 dB. As long as the 3 dB variation is manifested, an unsaturated status will have been assured.
- ⑥ Since the filter of this equipment is automatically set being linked with the central frequency and the span of spectrum analyzer, it is not necessary to operate the BAND key of this equipment.

CAUTION

1. However, for measuring 9 kHz to 30 kHz, set the stop frequency of spectrum analyzer to 60MHz or less.  
If the stop frequency is set to more than 60 MHz, the filter enters the filter range of 30MHz to 1GHz regardless of the central frequency.
2. If the specification is changed, synchronization is not made until a sweeping is completed.
3. When the linear mode is used for the spectrum analyzer, the reference level of the spectrum analyzer is not changed in response to the changes in this equipment attenuator setting.



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3.3 GPIB Command

3.3 GPIB Command

Individual functional settings of this equipment may be made with ease, by sending the GPIB commands to the spectrum analyzer.

Table 3 - 1 GPIB command

GPIB command	Function	Setting
A0 A1 A2 A3 A4 A5	Input attenuator	0 dB 10 dB 20 dB 30 dB 40 dB 50 dB
PO PF	PRE AMP	PRE AMP ON PRE AMP OFF
BO BF	Bypass	Bypass ON Bypass OFF
LO LF	Linearity check	Linearity check ON Linearity check OFF

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4.1 Storage

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4. STORAGE AND TRANSPORTATION OF THIS EQUIPMENT

4.1 Storage

The storage temperature range of this equipment is from  $-25^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ . When this equipment is not used for a long time, either protect it with a vinyl cover or put it in a corrugated box and keep it in a dry place where there is no direct sunlight.

4.2 Transportation

When this equipment is to be transported, use the original packing material or similar.

If the original packing material cannot be used, use a corrugated box 5 mm thick or more, and wrap this equipment with cushioning material before placing in the corrugated box. Also wrap the attachments in cushioning material together with this equipment.



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5. PERFORMANCE ITEMS

5. PERFORMANCE ITEMS

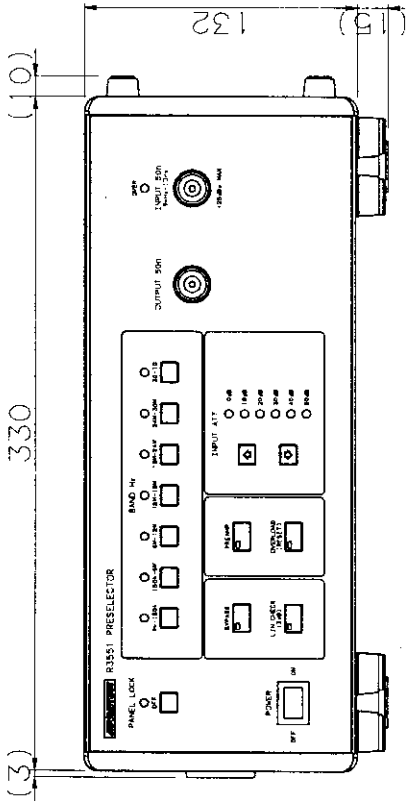
- Measuring range : 9 kHz to 1 GHz
- Sweep time : 1 sec or more for each setting
- I/O connector : 50  $\Omega$  N type connector
- Input attenuator : 0 dB to 50 dB, 10 dB steps
- PRE AMP : 30 dB  $\pm$ 1.5 dB
- Linearity check : 3 dB attenuator
- Bypass circuit : Insertion loss is 1.5 dB or less (9 kHz to 1 GHz)
- Input protection switch : Operates for +20 dBm  $\pm$ 2 dBm of output.
- Max. input level : +25 dBm (20 dB or more of input attenuator is used.)
- Operating environment : 0°C to +50°C, 85% or less relative humidity
- Storage temperature range: -25°C to +70°C
- Power supply :

Option No.	Standard	32	42	44
Line voltage (V)	90 to 110	103 to 132	198 to 242	207 to 250

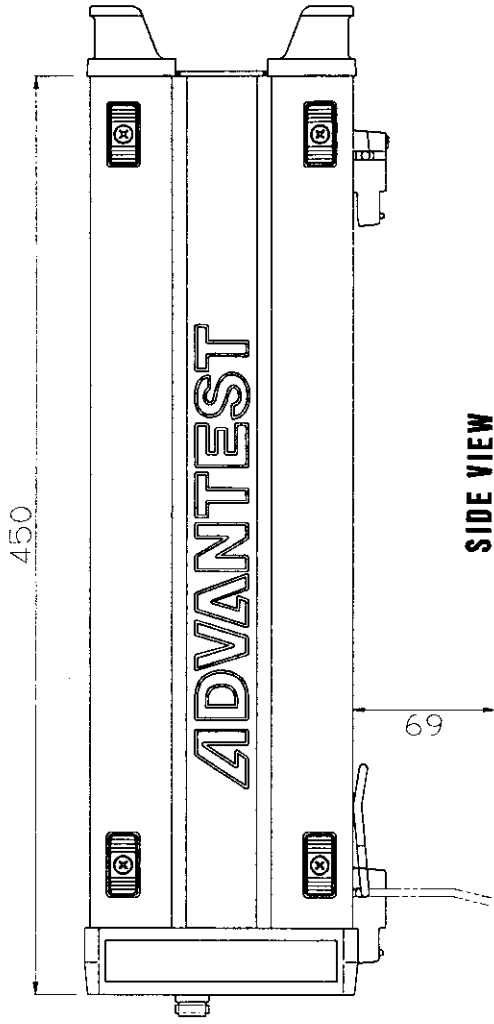
48 to 66 Hz

- Power consumption : 50 VA or less
- External dimensions : Approx. 330 mm (width) x 132 mm (height) x 450 mm (depth)
- Weight : 11 kg or less

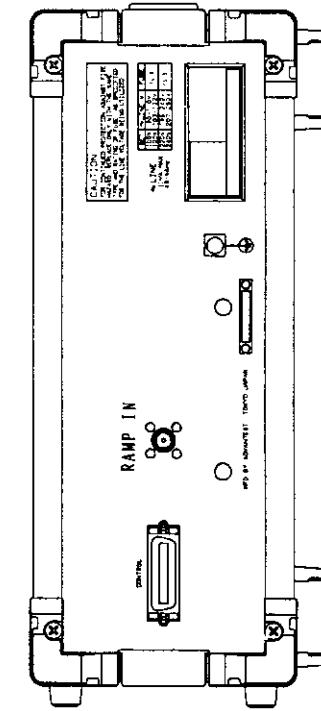




**FRONT VIEW**



**SIDE VIEW**

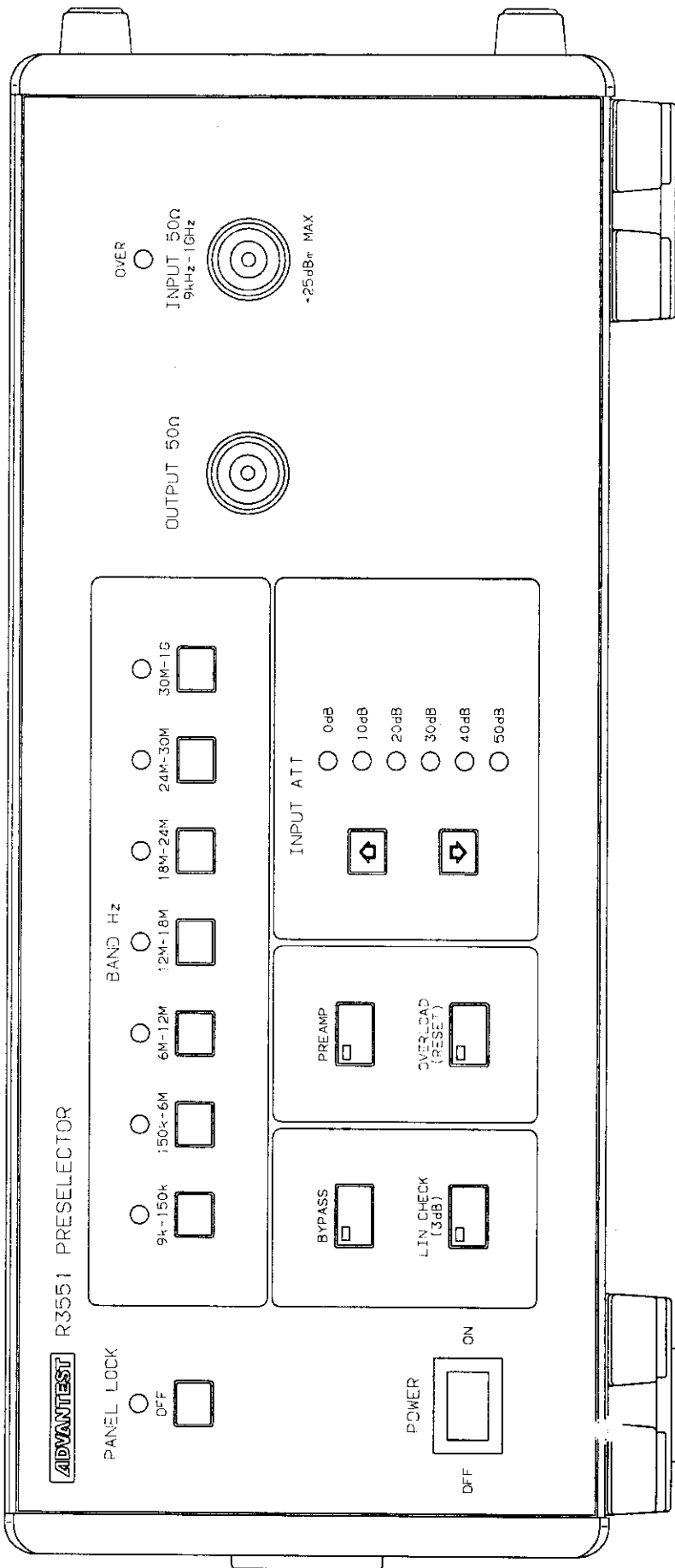


**REAR VIEW**

Unit:mm

**R3551**

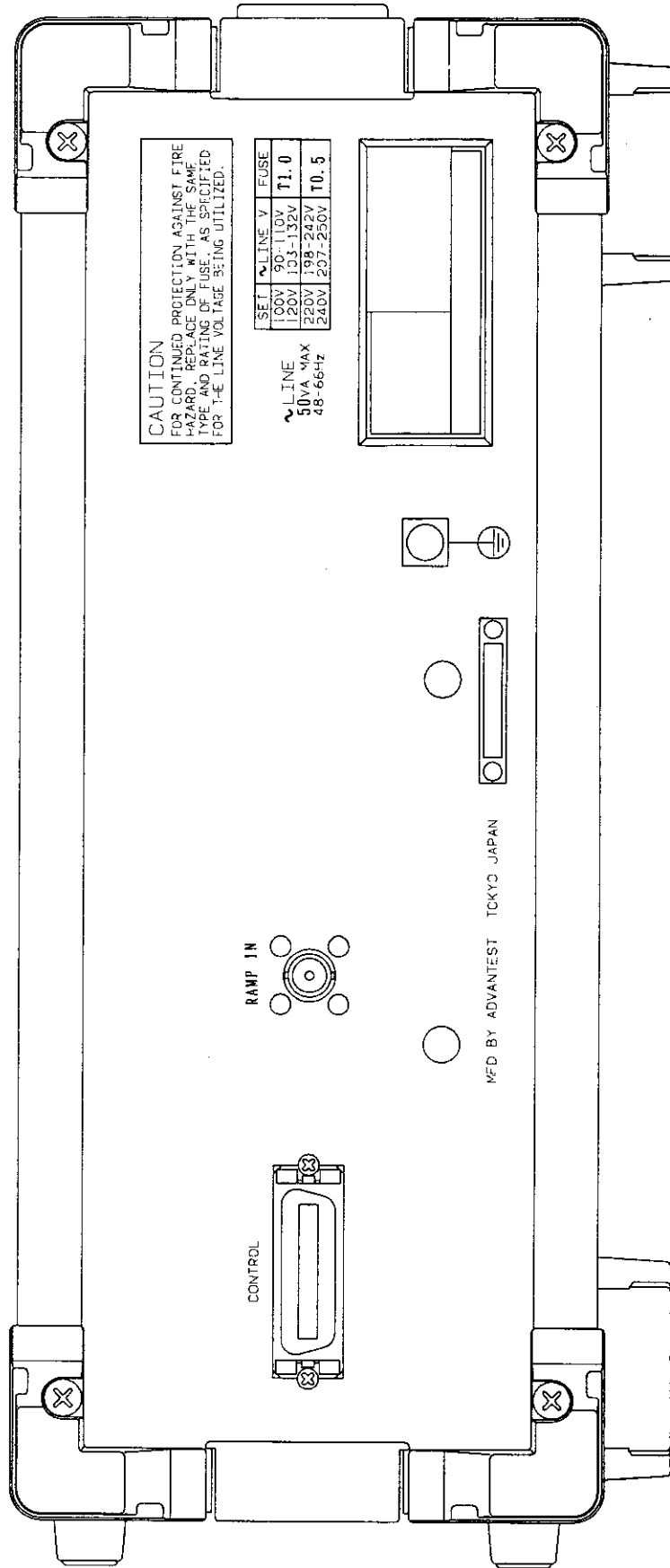
**EXTERNAL VIEW**



**R3551**

**FRONT VIEW**

**3551EXT2-901-A**



R3551

REAR VIEW

3551EXT3-901-B





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In order to maintain safe and trouble-free operation of the Product and to prevent the incurrence of unnecessary costs and expenses, Advantest recommends a regular preventive maintenance program under its maintenance agreement.

Advantest's maintenance agreement provides the Purchaser on-site and off-site maintenance, parts, maintenance machinery, regular inspections, and telephone support and will last a maximum of ten years from the date the delivery of the Product. For specific details of the services provided under the maintenance agreement, please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest's sales representatives.

Some of the components and parts of this Product have a limited operating life (such as, electrical and mechanical parts, fan motors, unit power supply, etc.). Accordingly, these components and parts will have to be replaced on a periodic basis. If the operating life of a component or part has expired and such component or part has not been replaced, there is a possibility that the Product will not perform properly. Additionally, if the operating life of a component or part has expired and continued use of such component or part damages the Product, the Product may not be repairable. Please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest's sales representatives to determine the operating life of a specific component or part, as the operating life may vary depending on various factors such as operating condition and usage environment.

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