ADVANTEST

ADVANTEST CORPORATION

R3754 Series
Network Analyzer
User Manual
(Product Overview)

MANUAL NUMBER FEE-8324149D00

Applicable models

R3754A
R3754B

First printing November 20, 1997
Printed in Japan

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

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

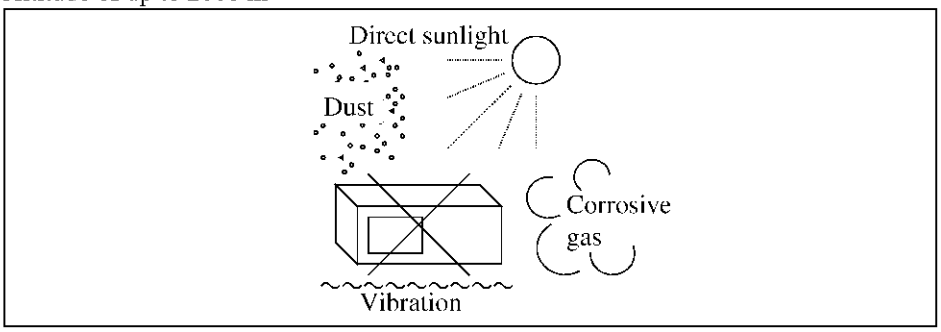


Figure-1 Environmental Conditions

- Operating position

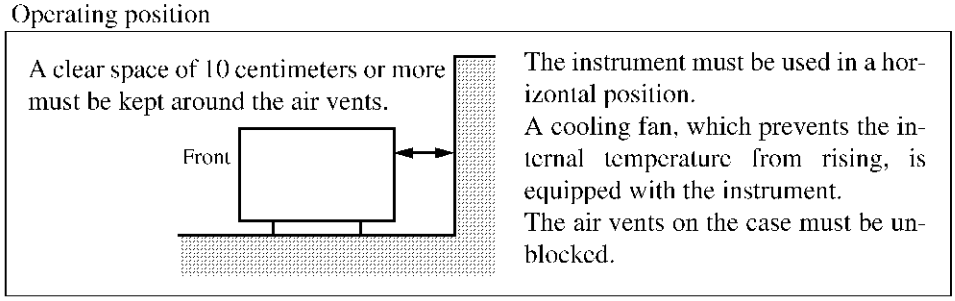


Figure-2 Operating Position

- Storage position

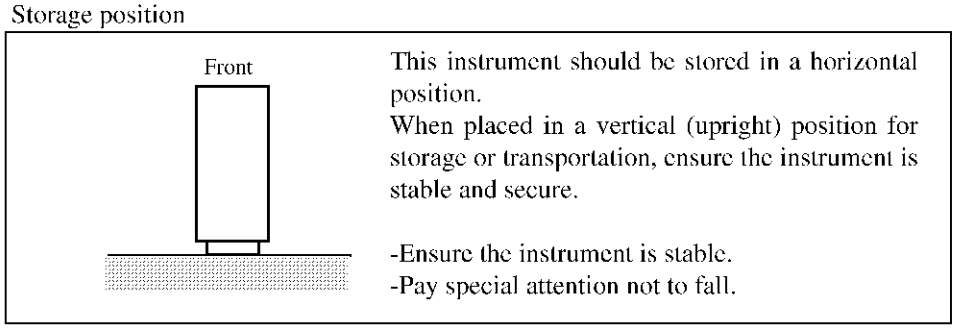


Figure-3 Storage Position

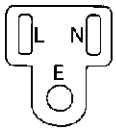
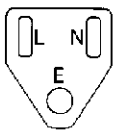
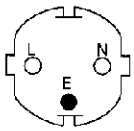
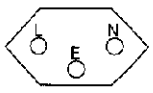
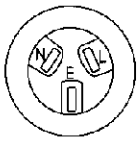
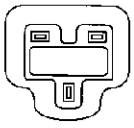
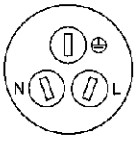
- The classification of the transient over-voltage, which exists typically in the main power supply, and the pollution degree is defined by IEC61010-1 and described below.

  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

Cautions on Using the R3754 Series

The front two feet beneath the front panel have small extensions which can be used to provide a better viewing angle (12-degree tilt).

Note the following when using the extensions:

- Use the analyzer on flat surfaces so that the weight of the analyzer is evenly distributed.
- Do not put any objects on the analyzer.
- Do not lean on the analyzer.
- Do not place anything (hands or other objects) between the analyzer and the flat surface on which it is placed.
- Do not slide the analyzer.
- Do not use excessive force when pressing keys (more than 1 kg).

Make sure the extensions are folded shut when:

- Transporting the analyzer.
- Connecting or disconnecting cables.
- Using the analyzer on a cart.
- The analyzer is not in use.
- The analyzer is in storage.
- The extensions show signs of wear.

Do not use the extensions if they show signs of excessive wear.
The extensions may wear out over time. If this occur, contact ADVANTEST or our service agency for information on how to replace them.

Certificate of Conformity

CE

This is to certify, that

Network Analyzer

R3754 Series

instrument, type, designation

complies with the provisions of the EMC Directive 89/336/EEC in accordance with EN50081-1 and EN50082-1 and Low Voltage Directive 73/23/EEC in accordance with EN61010.

ADVANTEST Corp.
Tokyo, Japan

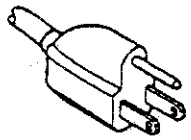
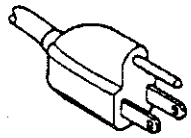
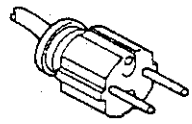
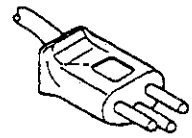
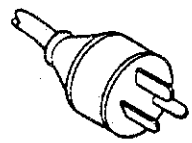
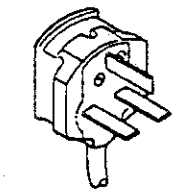
ROHDE&SCHWARZ
Engineering and Sales GmbH
Munich, Germany

3754.00

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

PREFACE

This manual only explains the product outline of the R3754 Series network analyzers. For operation details, refer to the "R3754 Series User Manual (Functional Descriptions)" (optionally available) and other related manuals.
Optionally available manuals of the R3754 Series are listed below as Option 91 (items 2. through 4.):

Manual		Outline	Remarks
1.	R3754 Series Network Analyzer User Manual (Product Overview) (this manual)	This manual only explains the product outline of the R3754 Series.	Standard attachment
2.	R3754 Series Network Analyzer User Manual (Functional Descriptions)	The following related to the R3754 Series are explained. • Operation methods • Functions and their descriptions • Measurement methods • Other information	Option 91
3.	R3752H/53H/54 Series Network Analyzer Programming Manual (separate volume)	GPIB and built-in BASIC are explained.	Option 91
4.	R3752/53/64/65/66/67H Series R3754 Series Network Analyzer Programming Guide (separate volume)	The creation and execution of BASIC program with the editor are explained.	Option 91

<Caution>

Information in this manual is subject to change without notice.

<Using this Manual>

(1) Organization of this manual

Organization		Remarks
Preface	In the beginning. Confirmation of the product and components.	Necessary to read before using of R3754 Series for the first time.
Contents	The configuration and the page of description.	Use it to find necessary information easily.
1.	Necessary information before starting to measure:installation, setup, cleaning, transportation and storage. The general remarks	
2.	Explanation of the front and rear panels and display screen. Name, functions and operations of the front and rear panel components. Contents of display screen	
3.	Performance test Method of confirming performance of catalog spec. of R3754 Series	Refer if necessary.
4.	Specifications Technical information and general information	
Dimensional outline drawings		

(2) Mark of caution level in this manual.

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

WARNING!
Indicates remarks concerned with personal safety and injury.

CAUTION!
Indicates remarks on damage or fire of the machine equipment, or explanations restrictions of use.

REFERENCE
Information helpful to you.

Note: Used for supplementary explanations.

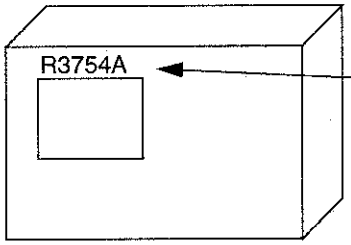
(3) This manual has the page with the mark (*) to the upper right of the pagination.

The mark (*) indicates the final page of each chapter.
(Pagination: Page number in the margin is called "pagination".)

<Confirmation of Product and Attachment>

When you open packing, confirms the following in the beginning.
If any flaw, damage and shortage in the product or the attachment, etc., is found, contact the nearest dealer or the sales and support office.

(1) Product main unit



Type and name of product.

Confirm the product the same as the order from the name plate in the front panel.

(2) Standard attachment lists

Note: Order the addition of the attachment etc. with type name or parts code.

Name	Type name	Parts code	Quantity	Remarks
Power cable	A01402	DCB-DD2428X01	1	3 pins plug
		JCD-AL003EX03	1*1	AC adapter
BNC-BNC cable	——	DCB-FF4894X04	1	60cm
User Manual (Product Overview)	——	JR3754SERIES(P)	1*2	Japanese
	——	ER3754SERIES(P)		English

Note: *1 : The AC adaptor is a standard attachment only for the instruments used in Japan.
****2 : One volume in either Japanese or English.***

(3) Optional attachment lists

Note: Order the addition of the attachment with parts code.

Name	Parts code	Remarks
User Manual (Functional Descriptions)	ER3754OPT91	One set consists of three manuals written in English.
Programming Manual		
Programming Guide		
Sample program disk	PR37670003-FJ	DD 720K bytes

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1 GETTING STARTED

1.1 About the R3754 Series

1.1.1 Product Description

The R3754 Series is the 150MHz vector network analyzer, which has newly been designed based on a concept "an optimum tool for each application".
We have fully pursued high throughput such as 50µs/points high-speed measurement at a resolution bandwidth (RBW) of 15kHz, 127dB (RBW 1kHz) wide dynamic-range measurement, and two-device simultaneous measurement with two-channel/four-trace display. Also, we have added the program sweeping function that can freely change the resolution bandwidth (RBW), output level, and input attenuator during sweep operation for each segment.
Since the R3754 Series employs semiconductor switches for changing the output level and for switching the input attenuator, it allows the optimum high-speed level sweeping for the drive level test of the oscillator.
With the built-in BASIC controller, a high-speed ATE system can be easily configured with no external controller for processes from adjustment to inspection.

<Features>

(1) High throughput

- 50µs/point high-speed frequency sweeping and 5ms short blanking time
  When two-channel/four-trace (magnitude/phase) and RBW 15kHz
- 50µs/point high-speed level sweeping (RBW 15kHz)
  High speed and long life using semiconductor switches

(2) Wide dynamic range

- With switching of input attenuator/preamplifier, 127dB wide dynamic range
- High speed and long life using semiconductor switches for switching input attenuator (RBW 1kHz)

(3) Program sweeping function

- For each segment, allows setting of frequency, output level, input attenuator, RBW and settling time.

(4) MS-DOS format disk

- By using an MS-DOS personal computer, it is possible to easily create programs and analyze data because of the disk conformed to MS-DOS format standard.
- Three modes of storage capacity are available (DD 720KB, HD 1.2MB and HD 1.44MB).

<About the Defective Picture Element (PIXEL) of the Color LCD>

The color LCD may present display problems caused by defective PIXELs as missing or normally lit ones.
Although ADVANTEST strives for zero defects in our LCD production line, this is not yet possible.

1.1.2 Overview

(1) Signal source

The signal output range is 10kHz to 150MHz and the output power range is +21dBm to -43dBm.

(2) Receiver

Signals in the receiver flow as follows:

① Input signal ranging from 10kHz to 150MHz are converted into 820kHz 1st IF signal by the 1st Mixer and transferred to the 2nd Mixer.

② The 1st IF signal is converted into 20kHz 2nd IF signal by the 2nd Mixer and output to the A/D circuit.

③ The A/D-converted data is calculated at a high speed by the digital signal processor (DSP) and displayed on the display.

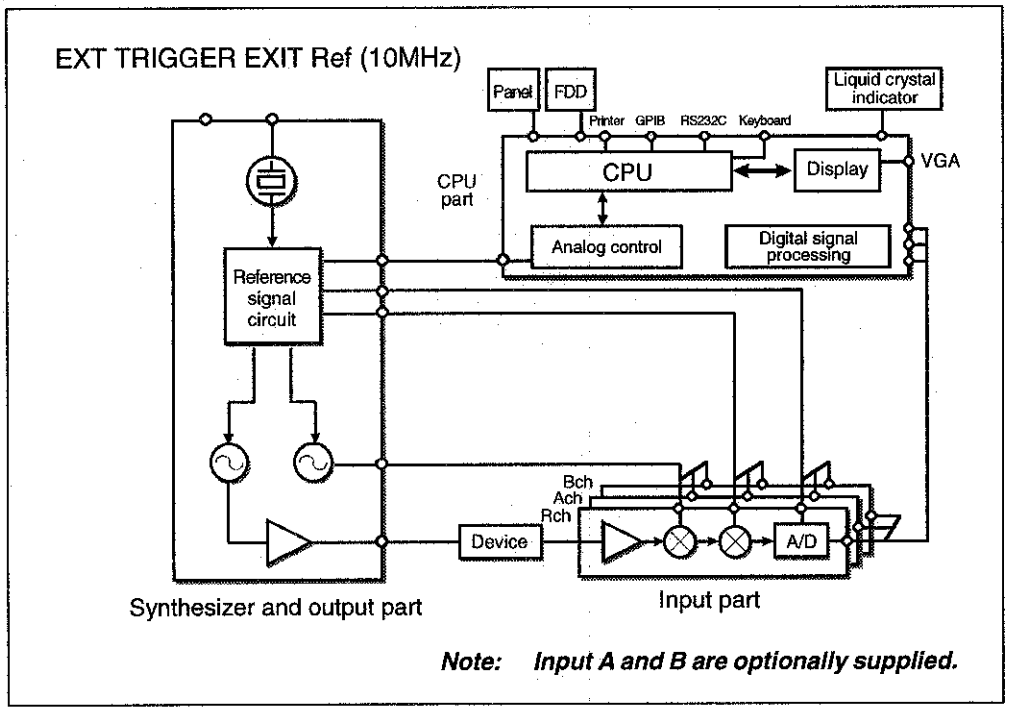


Figure 1-1 Block Diagram

1.1.3 Data Flow

The signal input in the receiver is processed according to the following flow:

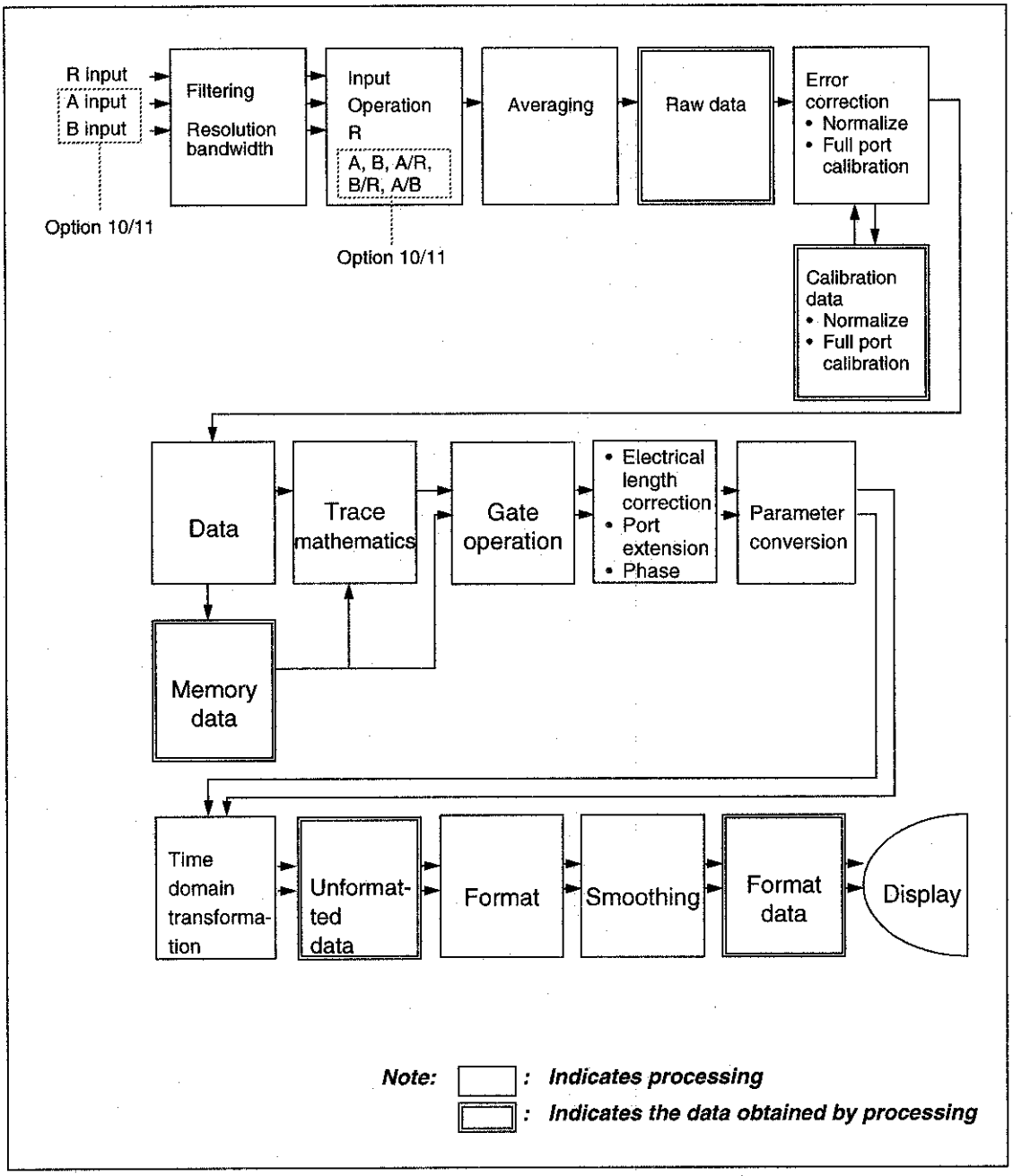


Figure 1-2 Data Flow

1.2 Environmental Conditions

- Operating Environment

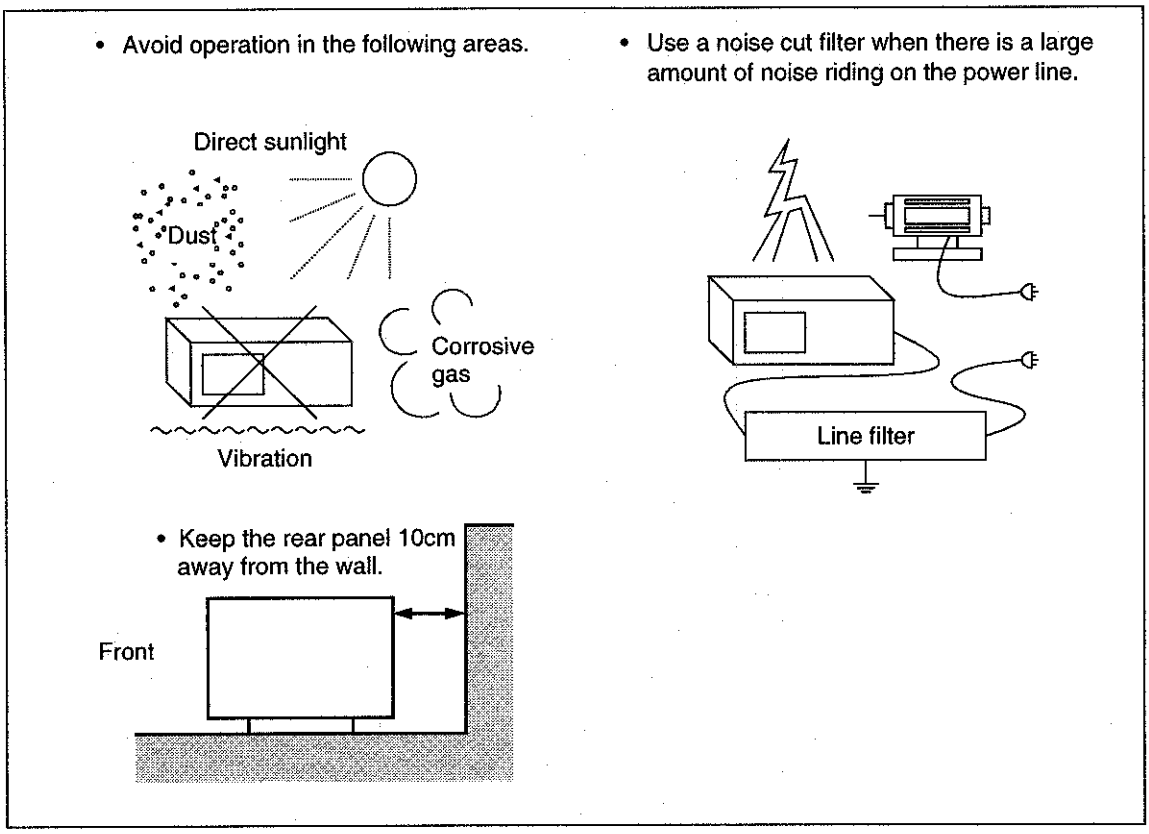


Figure 1-3 Operating Environment

The R3754 Series should be installed in an area which satisfies the following conditions:

- Operating temperature range: 0°C to +40°C (R3754A)
  0°C to +50°C (R3754B)
- Relative humidity: 80% or less (no condensation)
- An area free from corrosive gas
- An area away form direct sunlight
- A dust-free area
- An area free from vibrations
- A low noise area
  Although the R3754 Series has been designed to withstand a certain amount of noise riding on the AC power line, it should be used in an area of low noise. Use a noise cut filter when ambient noise is unavoidable.
- Installation position
  The R3754 Series has an air outlet hole on its rear panel. Never block or plug the hole, as the resulting internal temperature rise will affect measurement accuracy.

The R3754 Series can be used safely under the following conditions:

- Altitude : 2000m maximum above the sea level
- Installation category II
- Pollution degree 2

1.3 Power Supply Description

1.3.1 Power Supply Specifications

WARNING!
Safely use R3754 Series according to the power requirement.
R3754 Series might be damaged in the case not following the power requirement.

The power requirement of R3754 Series is shown in the following.
Use the power supply by which the power requirement of R3754 Series is satisfied.

Input Voltage	$100V_{AC}$ operation	$200V_{AC}$ operation
	AC100V to 120V	AC220V to 240V
Frequency	50/60Hz	
Fuse	T5.0A/250V	
Power consumption	200VA or less	

* This input voltage is automatically switched between $100V_{AC}$ system and $200V_{AC}$ system. The above input voltage is the standard of the R3754 Series. The available range of the AC power is 90 to 132V and 198 to 250V.

1.3.2 Replacing the Power Fuse

WARNING!
Use the power fuse of the standard by which power supply voltage is satisfied.

The power fuse is located in the power connector on the rear panel.
Check or replace the power fuse as follows.

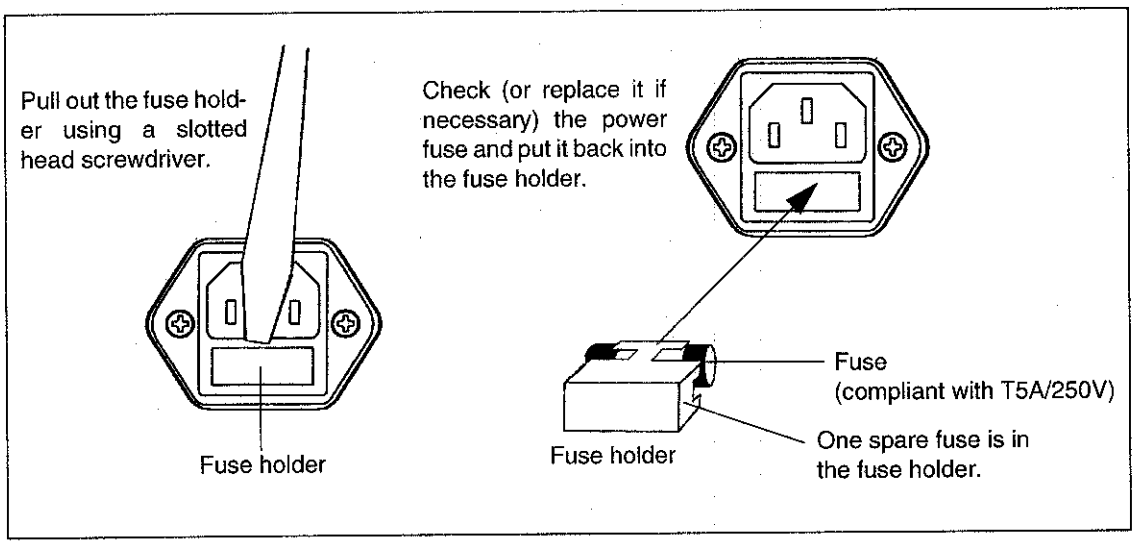


Figure 1-4 Check or Replace of Fuse

1.3.3 Connection the Power Cable

WARNING!

1. ***Power cable***
   - ***Use power cable of the attachment for prevention electric shock and fire. A standard attachment conforms to The Law on Electrical Appliances of Japan.***
   - ***Use power cable in accordance with the safety standard of the country for use excluding Japan.***
   - ***When you connect power cable with the outlet, turn off the power switch.***
   - ***When you pull out power cable from the outlet, have the plug.***

2. ***Protective earth***
   - ***Connect the power plug cable with the power outlet which has the protective earth terminal.***
   - ***If the code for the extension without the protective earth terminal is used, the protective earth will become invalid.***
   - ***Case in which use of AC adapter (Three pins to two pins conversion adapter), connect the earth pin of the adapter to the earth of the outlet, or connect ground terminal of the rear panel with the earth of the outside, and ground it to the earth.***

(1) Power cable

The spectrum analyzer has a detachable power cable with a three-contact plug for connection to the power source and a protective earth ground. The protective earth ground contact on the plug connects (through the power cable) to the accessible metal parts of the instrument. For protection against electrical shock, insert the plug into a power-source outlet that has a properly grounded, protective-ground contact.
The manufacturer ships the required power cable, as ordered, with the spectrum analyzer. Information about the available power cords is shown in Power Cable Option. Contact your ADVANTEST representative or the local ADVANTEST Field Office for additional information about power cables.

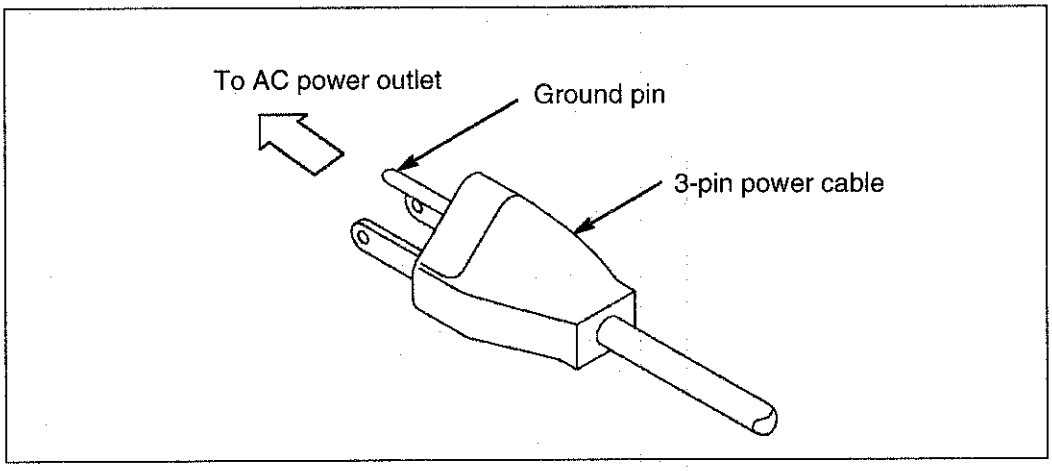


Figure 1-5 Power Cable

(2) Power plug for overseas use

A separately-sold plug for overseas use is available. For more information, contact ADVANTEST's Service Department.

1.4 Input Signal Level Overload Cautions

A maximum level that can be measured at the input part is 5dBm. (When an input attenuator is set to 25dB)
If a signal with its level 5dBm and more is added to the input, some messages are displayed.

(1) If a signal with its level 6dBm or more and with its frequency 100kHz or more is added to the input, "Overload" is displayed.

1.5 Cleaning, Storage and Transportation

(1) Cleaning

Wipe the dirt of R3754 Series off with a soft cloth (or wet cloth). At this time, attend to the following points.

- Do not remain the fluff of the cloth and do not soak water into the internal of R3754 Series.
- Do not use an organic solvent (for example, benzene and acetone, etc.) which changes plastics in quality.

(2) Storage

The cases in which R3754 Series is not used for a long time, cover with the vinyl cover or put in the cardboard box and prevent dust. Keep it in a dry place where dust and direct sunshine are prevented.
Storage temperature range: -20°C to +60°C

(3) Transportation

When you transport the R3754 Series, pack it equally to the first packing material or any more.

Packing procedure

① Wrap R3754 Series itself with cushion material and put in the cardboard box.

② After putting the attachments, fill the box with cushion again.

③ Close the lid of the cardboard box. Fix the outside with string or tape.

1.6 Notes on Use

(1) Before starting the measurement

When turning on the power, do not connect the DUT.
Before starting the measurement, check to see the output power level.

(2) Opening the case

Only ADVANTEST authorized service personnel can open this case.

(3) When abnormality occurs

When smoke rises from R3754 Series, smell nastily, or hear unusual sound feel, turn off the power switch. Pull out power cable from the outlet. And contact to our company.
The address and the telephone number of our company are in the end of this manual.

(4) Electromagnetic interference

High frequency noise of the small power is generated at R3754 Series use.
Therefore, electromagnetic interference is generated to the television or the radio by an improper installation and use of R3754 Series.
If the power of R3754 Series is turned off, and the electromagnetic interference is reduced, then R3754 Series is the cause of it.
Prevent electromagnetic interference by the following procedure.

- Change the direction of antenna of the television or the radio.
- Place R3754 Series the other side of the television or the radio.
- Place R3754 Series away from the television or the radio.
- Use another line of power source for the television or the radio than R3754 Series.

2 PANEL DESCRIPTION

The front panel is explained in section 2.1.
The front panel screen display is explained in section 2.2.
The rear panel is explained in section 2.3.

2.1 Front Panel Descriptions

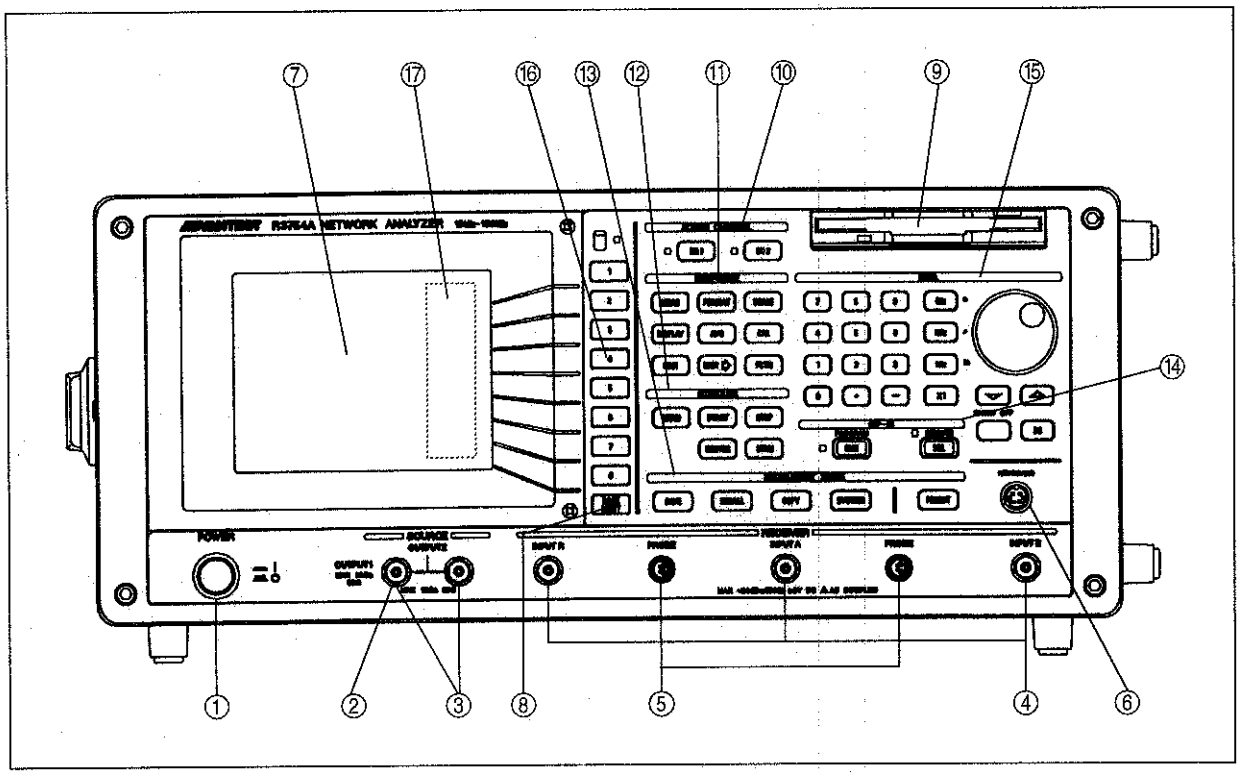


Figure 2-1 Front-Panel Descriptions (R3754A)

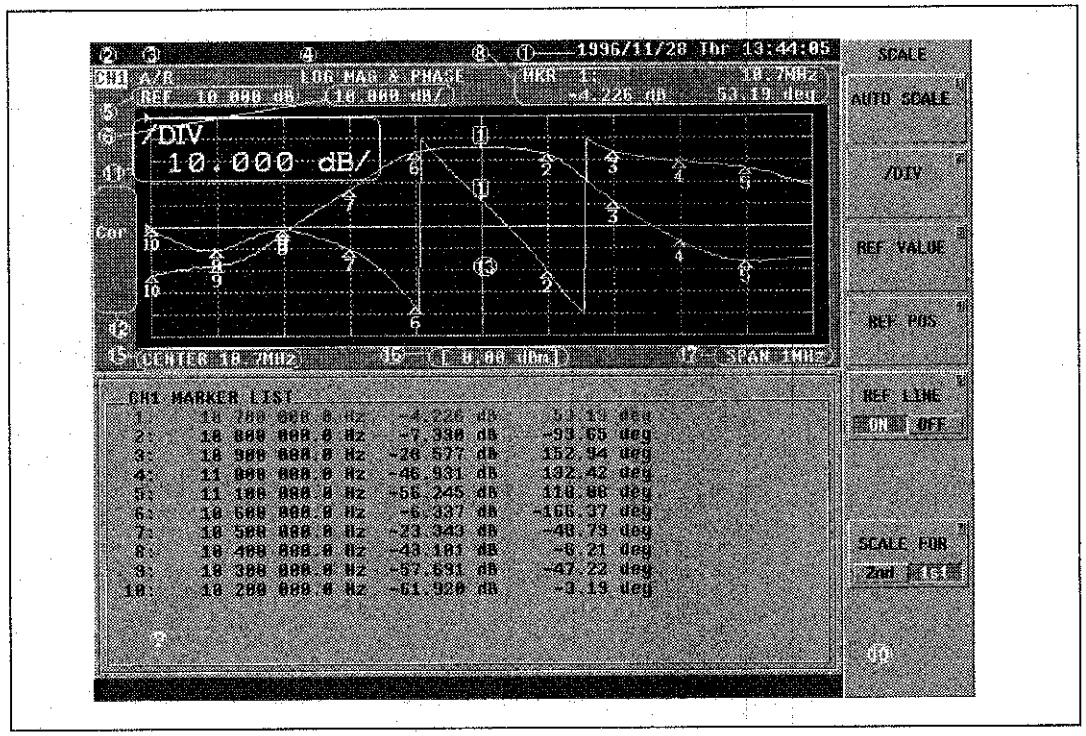
(1 of 2)

No.	Name	Description
①	POWER switch	Turns on or off the power supply of the R3754 series.
②	SIGNAL SOURCE OUTPUT connector (OUTPUT1)	Single output The OUTPUT connector is used to perform a measurement by connecting 3-branch power splitter for absolute measurement or 2-device measurement.
③	SIGNAL SOURCE OUTPUT connector (OUTPUT2)	Power splitter output
④	RECEIVER SECTION INPUT connector INPUT R INPUT A INPUT B	The INPUT connector is used for reference input and measurement input. ***Note: The input connector differs according to additional option.*** Standard: INPUT R Option 10: INPUT R, A Option 11: INPUT R, A, B
⑤	PROBE POWER connector	Connector for probe power ±12V output Standard: None Option 10: 1-connector Option 11: 2-connector
⑥	KEYBOARD INPUT connector	The KEYBOARD INPUT connector is used to connect a keyboard belonging to IBM-PC/AT or PS/2 series. An external keyboard can be used to input a label name, a saving register name and a BASIC text.
⑦	LCD display	Displays measurement data, setting conditions and other informations.
⑧	BACK LIGHT	Selects the back light ON/OFF of LCD display. (for the R3754A, pressing this switch turns the screen contrast on or off)
⑨	Floppy disk drive	Stores a program and measurement data. Three modes of storage capacity (DD: 720KB, HD: 1.2MB, HD: 1.44MB).
⑩	ACTIVE CHANNEL block	The ACTIVE CHANNEL block is used to select an active channel from independent two measurement channels. After selecting, functions to be operated are effective to the selected active channel.

(2 of 2)

No.	Name	Description
⑪	RESPONSE block	The RESPONSE block is used to set measurement conditions of receiver section, data display and data analysis.
⑫	STIMULUS block	The STIMULUS block is used to set frequencies, level and sweep conditions of signal source.
⑬	INSTRUMENT STATE block	The INSTRUMENT STATE block is used set the system functions which have no concern with the measurement.
⑭	GPIB block	The GPIB block is used to set a GPIB and controller functions.
⑮	ENTRY block	The ENTRY block is used to input numeric data and to move a marker.
⑯	Soft keys	Selects the soft key menu described in ⑰ in each function block.
⑰	Soft key menu	Displays each function menu. To select a menu, use the soft key described in ⑯.

2.2 Screen Display Descriptions



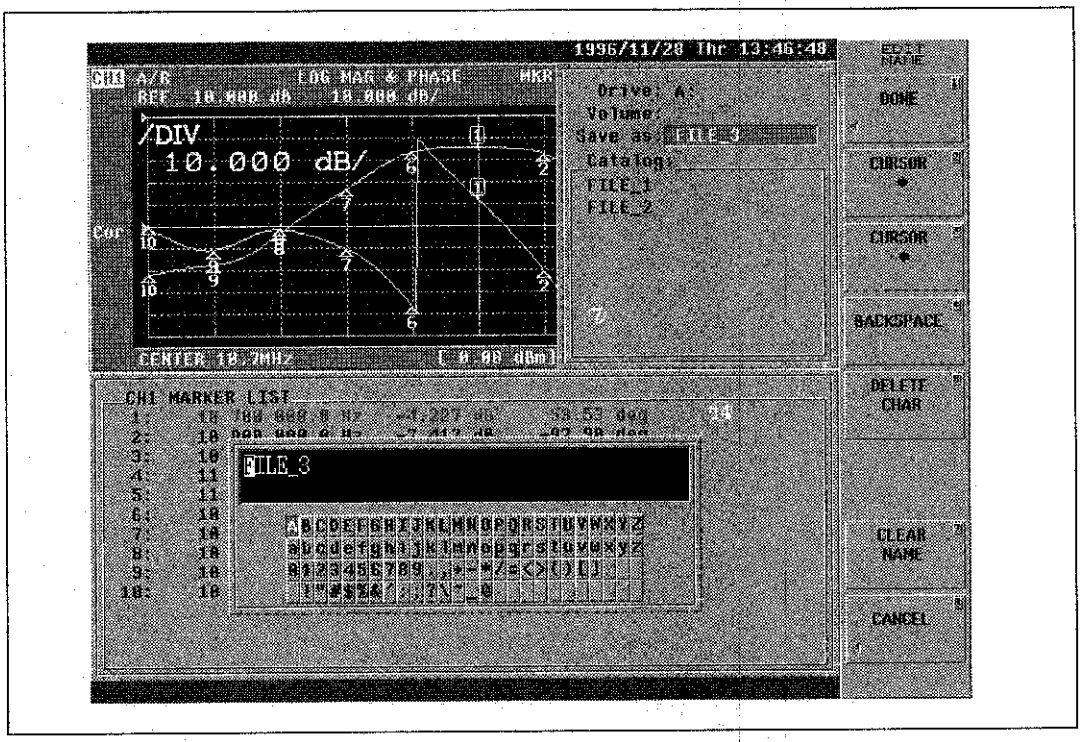


Figure 2-2 Screen Display Descriptions

No.	Name	Description
①	Real time clock	Displays year, month, date and time.
②	Channel	Displays a channel number.
③	INPUT port	Displays an input port.
④	Format	Displays data format (format data).
⑤	Scale reference	Displays a reference value of display coordinate. The reference position is displayed by using ▷ mark.
⑥	Scale/DIV	Displays one scale value of display coordinate.
⑦	Load menu	Displays files in this area when loading program from the disk drive.
⑧	Active marker	Displays an active marker value.
⑨	Marker list	Displays a marker list.
⑩	Soft key menu	Displays a soft key menu.
⑪	Active area	Displays items selected by panel keys or soft keys and those input values.
⑫	Status area	Displays status which shows an operating state of the R3754 series.
⑬	Trace display area	Displays measurement data.
⑭	Label window	Displays character lists used for a label and a register name.
⑮	Start/Center	Displays the start/center of signal source.
⑯	Power/CW	Displays the power/CW of signal source.
⑰	Stop/Span	Displays the stop/span of signal source.

2.3 Rear Panel Descriptions

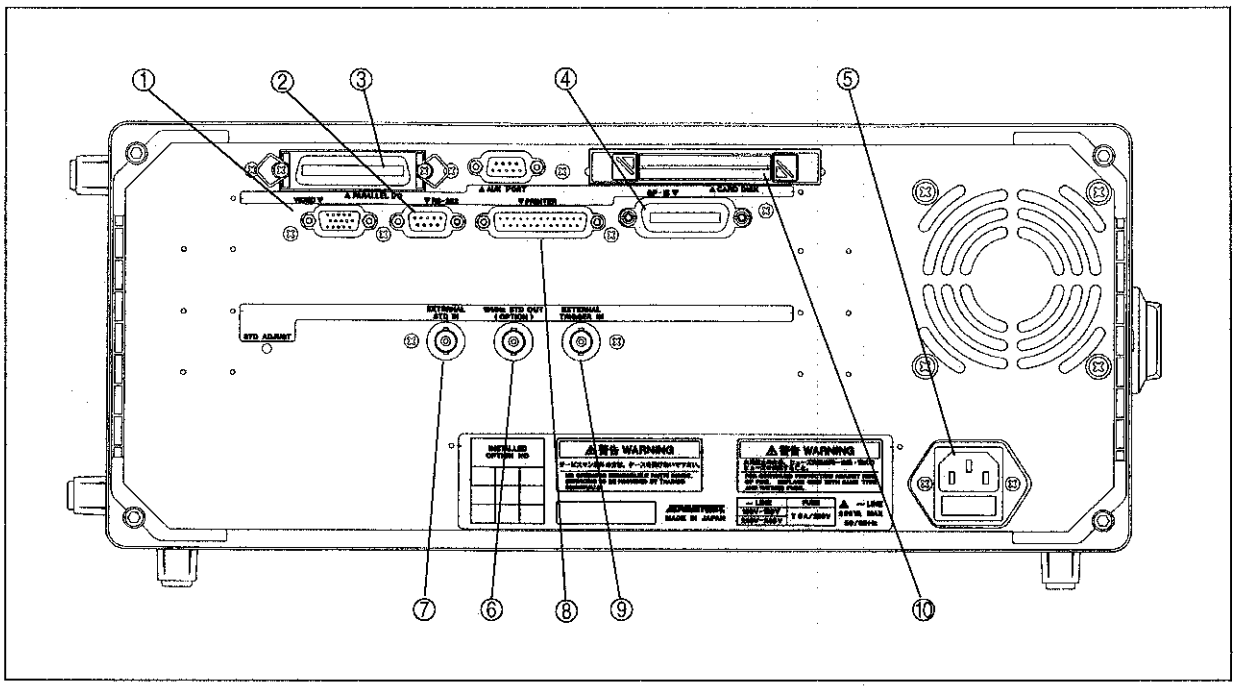


Figure 2-3 Rear Panel Descriptions (R3754A)

No.	Name	Description
①	VIDEO SIGNAL output	Video signal output corresponding to VGA (15-pin).
②	SERIAL I/O	Input/output connector conformed to RS-232 standard.
③	PARALLEL I/O connector	The I/O port connector is used to communicate peripheral devices such as an automatic machine and a foot switch. (Output: 8-bit 2 systems, Input/output: 4-bit 2 systems) EXT TRIGGER input (Negative logic, pulse width: 1μs or more, 18-pin terminal) ***Note: Use shielded cables for connection (to prevent malfunction by noise).***
④	GPIB connector	The GPIB connector is used to remotely control external peripheral devices and to be remotely controlled by an external controller.
⑤	AC POWER connector	The AC POWER connector which has three-pin structure includes an earth pin. To remove a power fuse, pull out the upper cover.
⑥	High stability reference frequency output connector (option 20)	This connector is used to output a high stability reference frequency when Option 20 is installed.
⑦	External reference frequency input connector	This connector is used to input a reference frequency from an external device. Input frequency: 1, 2, 5, 10MHz, 0dBm or more Input frequency accuracy: Within ±10ppm
⑧	Printer output connector	Connector for printer conformed to Centronix standard.
⑨	EXT TRIG IN	Connector for external trigger signal input (Negative logic, pulse width: 1μs or more)
⑩	Slot for option card	Slot for option card (PCMCIA)

3 PERFORMANCE TEST

This chapter describes testing procedures designed to maintain this analyzer's efficiency. For items not covered in this chapter, contact ADVANTEST.

3.1 Preparing for a Performance Test

(1) Warm up

Warm up the R3754 Series for at least 30 minutes before executing the performance test.

(2) Preparing measurement instruments

The following measurement instruments are required to perform the test items as shown in Table 3-1.

Table 3-1 Required Measurement Instruments for Performance Test (1 of 2)

Test items	Measurement instrument		Remarks
1. Frequency accuracy and range	• Counter Frequency: 10kHz to 150MHz Display: 7 digits or more Accuracy: 0.1ppm or less	Model R5372 (to 18GHz) or Model R5373 (to 26GHz) (Manufactured by ADVANTEST)	Refer to section 3.2
	• BNC-BNC cable		
2. Output/ Input level and flat-ness	• Power meter Frequency: 100kHz to 150MHz Power range: -43dBm to +21dBm	HP436A (HP437B) (HP438A) (Calibrated under the national stand-ard)	Refer to section 3.3
	• Power sensor Frequency: 100kHz to 150MHz Power range: -43dBm to +21dBm	HP8482A	
3. Output level linearity	• Power meter Frequency: 100kHz to 150MHz Power range: -43dBm to +21dBm	HP436A (HP437B) (HP438A) (Calibrated under the national stand-ard)	Refer to section 3.4
	• Power sensor Frequency: 100kHz to 150MHz Power range: -43dBm to +21dBm	HP8482A	

Table 3-1 Required Measurement Instruments for Performance Test (2 of 2)

Test items	Measurement instrument		Remarks
4. Spectral purity (Phase noise)	• Spectrum analyzer 10kHz to 150MHz	R3265A (to 8GHz) (Manufactured by ADVANTEST)	Refer to section 3.5
	• BNC cable		
	• N-BNC conversion connector		
5. Input return loss	• Network analyzer 300kHz to 500MHz	R3763B (to 3GHz) (Manufactured by ADVANTEST)	Refer to section 3.6
	• Calibration kit	MODEL9617K3 (Recommended by ADVANTEST)	
	• BNC cable (60cm or less)		
	• N-BNC conversion connector		
6. Input level accuracy (Absolute value measure-ment)	• Power meter Frequency: 50MHz Power range: -10dBm to +10dBm	HP436A (HP437B) (HP438A) (Calibrated under the national stand-ard)	Refer to section 3.7
	• BNC cable (60cm or less)		
7. Input level accuracy (Absolute value measure-ment)	• BNC cable × 2 (60cm or less)		Refer to section 3.8
10. Crosstalk	• BNC terminator		Refer to section 3.11
	• BNC cable (60cm or less)		

(3) General note

- Use an AC power source having a voltage of 100V to 120V, 220V to 240V and a frequency of 48Hz to 66Hz.
- Connect the power supply cable only after turning off the power switch.
- The R3754 Series should be free from dust, vibration and noise and be tested under the following conditions:
  Temperature : 23°C ± 5°C
  Relative humidity : 80%RH or less

3.2 Frequency Accuracy and Range

Testing procedure

① Setup the R3754 Series as shown in the figure below.

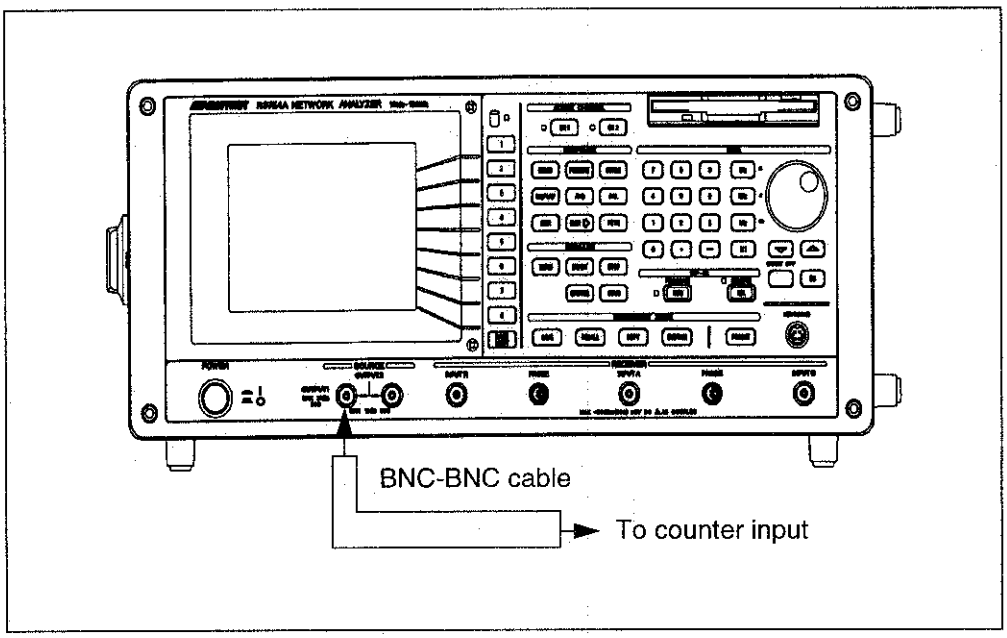


Figure 3-1 Frequency Accuracy and Range

② Set the R3754 Series as follows.

Span : 0Hz
Sweep mode : SINGLE
Output port : OUTPUT1

③ Change any center frequency in the range of 10kHz to 150MHz.

④ Check that the counter read frequency < center frequency ± center frequency × 5 × 10^{-6}

Example: When the center frequency is at 10MHz, the range is 10MHz ± 50Hz (that is between 9,999,950Hz and 10,000,050Hz).

3.3 Output Level Accuracy and Flatness

Testing procedure

(1) Setup the R3754 Series as shown in the figure below.

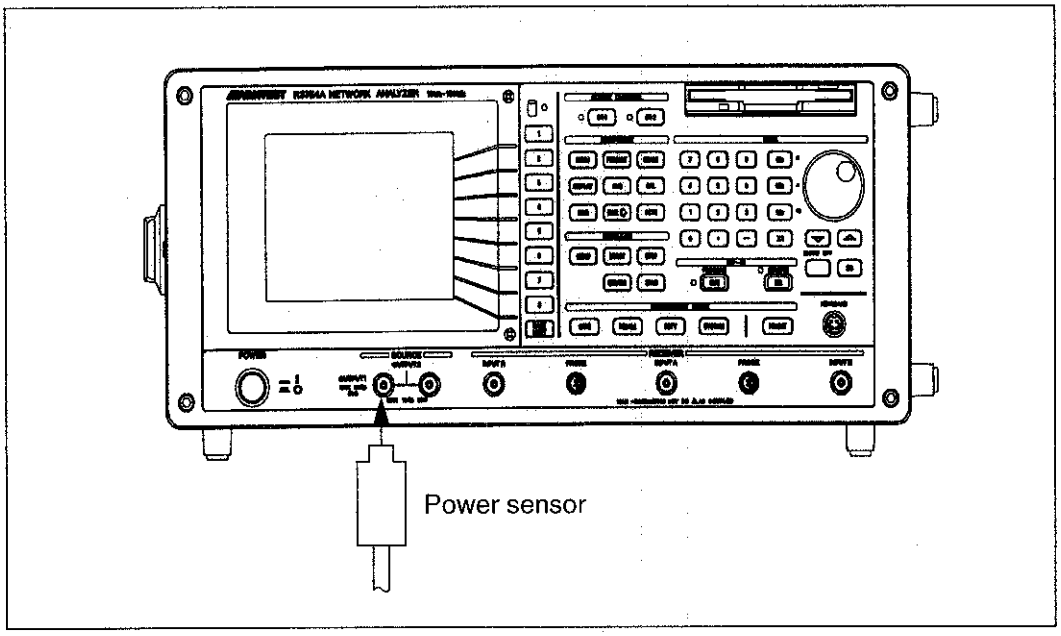


Figure 3-2 Output Level Accuracy and Flatness

(2) Output level accuracy

① Perform the ZERO calibration for the power meter.

② Set the R3754 Series as follows.

Center frequency	:	10MHz
Span	:	0Hz
Output level	:	0dBm
Output port	:	OUTPUT1

③ Connect the power sensor to the output terminal and perform the measurement.

Note: The calibration factor should be set to 10MHz.

④ Check the output level accuracy of ±0.5dB at 0dBm and 10MHz.

(3) Flatness

① Perform the ZERO calibration for the power meter.

② Set the R3754 Series as follows.

Center frequency	:	10MHz
Span	:	0Hz
Output level	:	0dBm

③ Press the **[REL]** key on the power meter and set it to 0dB (ratio measurement mode).

④ The span and the output level are fixed. Change the center frequency and read data from the power meter.

Note: Use the calibration factor at the center frequency.

⑤ Check that the Flatness of 0dBm is as follows.

10kHz to 300kHz	:	± 2.0dB
300kHz to 150MHz	:	± 1.5dB

3.4 Output Level Linearity

Testing procedure

① Perform the ZERO calibration for the power meter.

② Set the R3754 Series as follows.

Center frequency	:	10MHz
Span	:	0Hz
Output level	:	0dBm
Output port	:	OUTPUT1

③ Connect the power sensor to the output terminal as shown in the figure below.

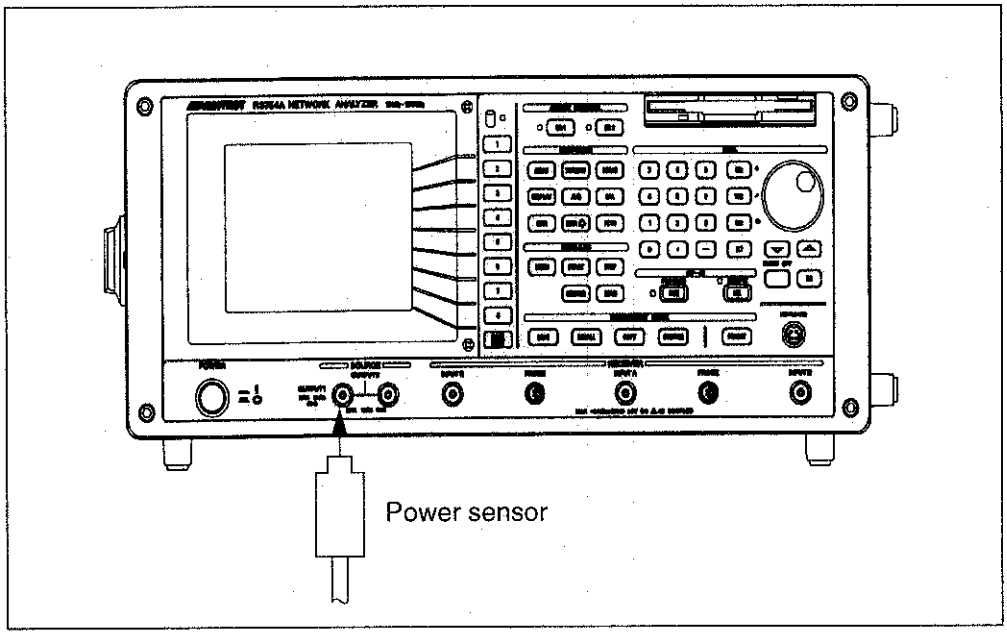


Figure 3-3 Output Level Linearity

④ Press the **[REL]** key on the power meter and set it to 0dB (ratio test mode).

⑤ Obtain the linearity data when the output level is changed.

Note: The calibration factor should be set to 10MHz.

⑥ Check that the output level linearity of 0dBm is as follows.

+21dBm to -35dBm	:	± 0.5dB
-35dBm to -43dBm	:	± 1.5dB

3.5 Spectrum Purity (Phase Noise)

Testing procedure

① In order to measure the spectrum purity, connect the R3754 Series and the spectrum analyzer, R3265A as shown in Figure 5-4.

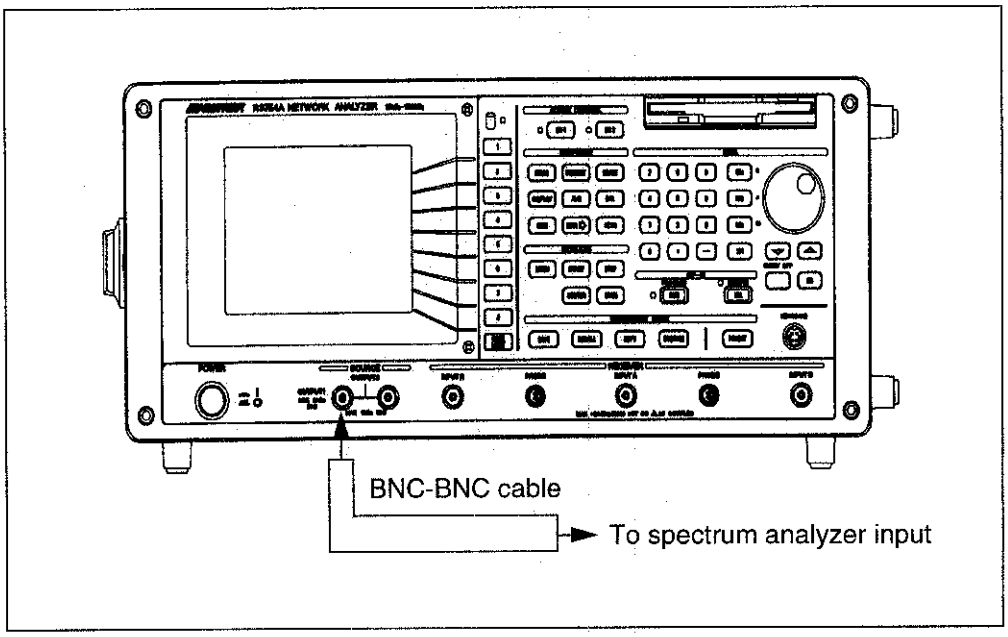


Figure 3-4 Spectrum Purity

② Set the R3754 Series as follows. (Other settings should be left at default values.)

Span frequency	:	0Hz
Sweep mode	:	SINGLE
Output port	:	OUTPUT1

③ Change any center frequency in the measurement range of the spectrum analyzer. (Setting range: 10kHz to 150MHz)

④ Set the spectrum analyzer as follows.

Center frequency	:	Center frequency set to the R3754 Series
Span frequency	:	50kHz
Resolution band width	:	1kHz
Average	:	32

⑤ After performing a peak search to get the MAX data, use the Delta Marker function to obtain the value at a point of +10kHz higher.
(Obtain a difference between the MAX value and the data at a point of +10kHz higher.)

⑥ Check {(readout of the difference) - 30} dBc/Hz < -95dBc/Hz.

3.6 Input Return Loss

Testing procedure

① In order to measure the input return loss, connect the network analyzer, R3763B as shown in Figure 5-5.

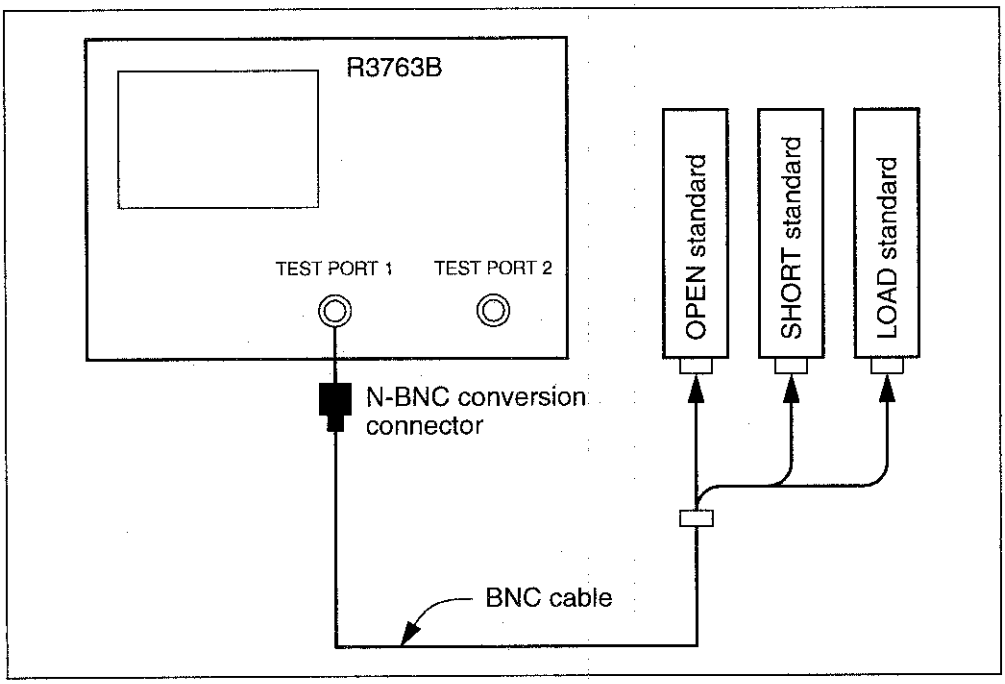


Figure 3-5 Connection for Measuring Return Loss

② When performing measurements, set the R3763B as follows.
(Other settings should be left at default values.)

Start frequency	:	300kHz
Stop frequency	:	150MHz
Measure	:	S_{11}
Resolution band width	:	100Hz

③ Perform the 1PORT FULL calibration.

(a) Press the **[CAL]** → *{CAL MENU}* → *{1PORT FULL CAL}* button.
(b) Connect the Open standard at the end of the BNC cable and press the *{OPEN}* button.
(c) Connect the Short standard at the end of the BNC cable and press the *{SHORT}* button.
(d) Connect the Load standard at the end of the BNC cable and press the *{LOAD}* button.
(e) Press the *{DONE 1-PORT}* key.

④ Connect R3763B to the Input Port R of the R3754 Series with the BNC cable as shown in the figure below.

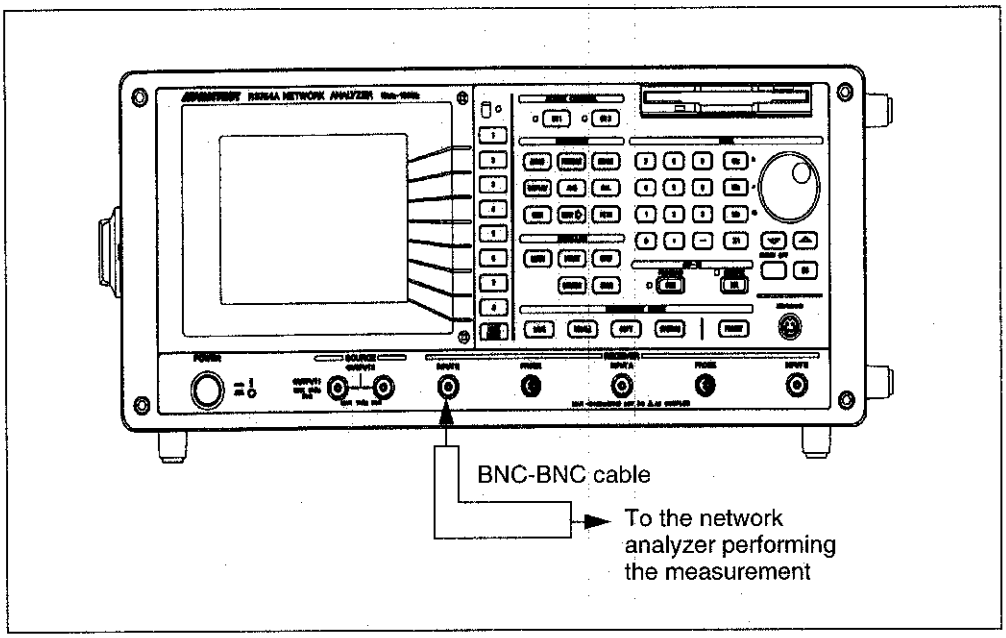


Figure 3-6 Input Return Loss

⑤ Set the R3754 Series as follows.
(Other settings should be left at default values.)

Center frequency	:	10kHz
Span frequency	:	0Hz
Input attenuator	:	20dB
Sweep mode	:	SINGLE (This setting should be made last.)

⑥ When the input return loss is to be measured, check that the readout of the R3763B is as follows.

Maximum value between 10kHz and 150MHz < -25dB

⑦ Set the R3754 Series as follows and sweep once using the SINGLE sweep mode.

Input attenuator : 0dB

⑧ When the input return loss is being measured, check that the readout of the R3763B is as follows.

Maximum value between 10kHz and 150MHz < -20dB

⑨ For model with Option 11, perform the same tasks for the Input Port A and the Input Port B.
For model with Option 10, perform the same tasks for the Input Port A.

3.7 Input Level Accuracy (Absolute value measurement)

Testing procedure

① Perform the ZERO calibration for the power meter.

② Setup the R3754 Series as shown in the figure below.

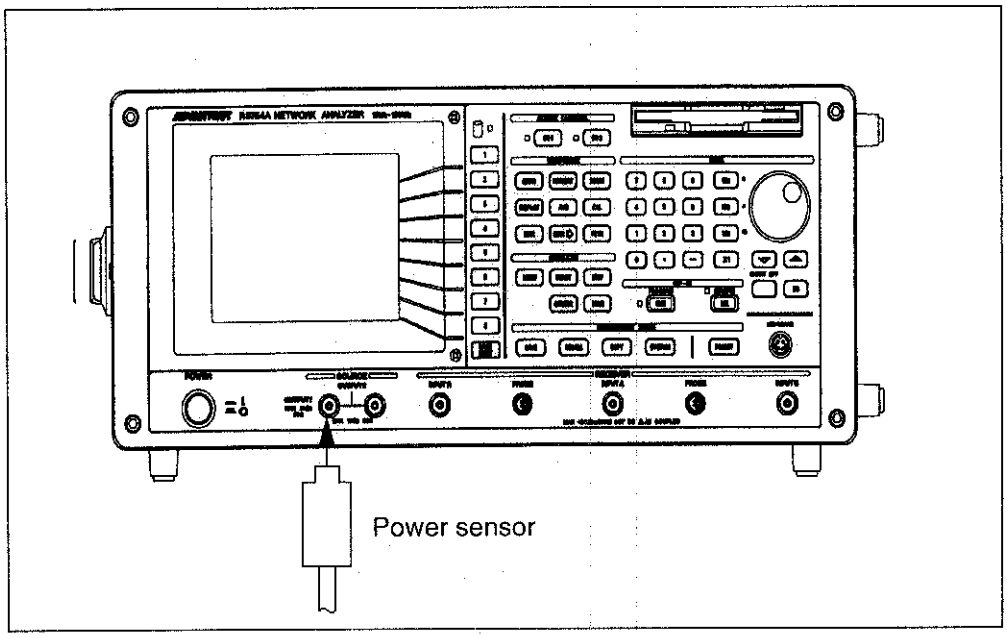


Figure 3-7 Input Level Accuracy (Output Level Calibration)

③ Set the R3754 Series as follows.
(Other settings should be left at default values.)

Center frequency	:	10MHz
Span frequency	:	0Hz
Output level	:	0dBm
Output port	:	OUTPUT1
Input port	:	R
Resolution band width	:	1kHz
Format	:	LOGMAG
Sweep mode	:	SINGLE

④ Connect the power sensor to the OUT1 and perform the measurement.

Note: The calibration factor should be set to 10MHz.

Connect OUT1 and Rch with the BNC cable as shown in the figure below.

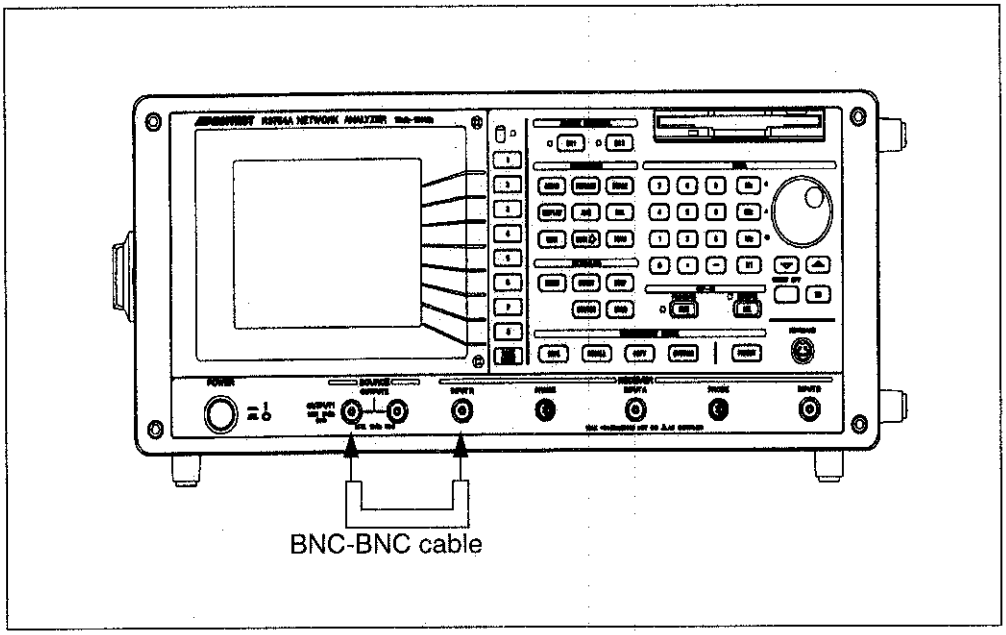


Figure 3-8 Input Level Accuracy

⑤ Sweep the frequency once using the SINGLE sweep mode and then read the measurement value by using the Marker.

⑥ <Check> : [(Measurement value by using the Marker) - (Measurement Value by using the Power meter)] : ± 0.5dB

⑦ For model with Option 11, connect the OUTPUT1 with the Ach in the same way and perform the measurement of Ach. And again connect the OUTPUT1 with the Bch and perform the measurement of Bch.
For model with Option 10, connect the OUT1 with the Ach in the same way and perform the measurement of Ach.

3.8 Input Level Accuracy (Relative value measurement) ------ Only for model with Option 10/Option 11

Testing procedure

① Connect the two BNC cables to the R3754 Series as shown in the figure below. (Use the cables that have the same length and the identical characteristics.)

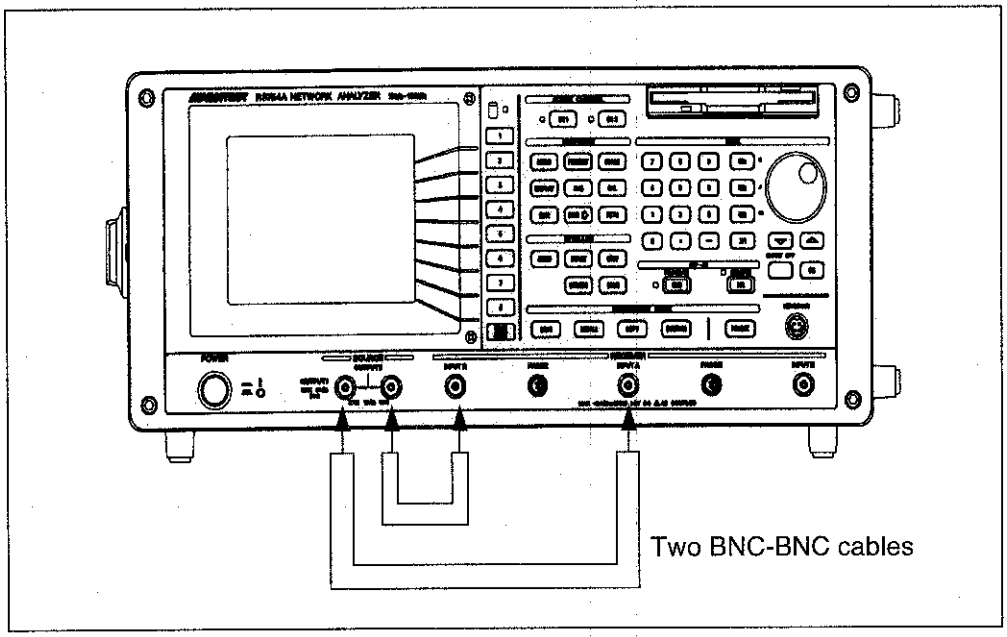


Figure 3-9 Input Level Accuracy (Relative Value)

② Set the R3754 Series as follows.

Center frequency	:	10MHz
Span frequency	:	0Hz
Output level	:	0dBm
Output port	:	OUTPUT2
Format	:	LOGMAG
Input port	:	A/R
Resolution band width	:	1kHz

③ Read the measurement value by using the Marker.

④ <Check> : Measurement value by using the Marker : ± 0.5dB

⑤ For model with Option 11, change the Input port to the Input B/R and A/B and perform the measurement in the same way and check it.

3.9 Noise Floor

Testing procedure (Describes the procedure about the Input Port R.)

① Nothing should be connected to the R3754 Series.

② Set the R3754 Series as follows.

Output level	: 0dBm
Number of the measurement points	: 1201
Smoothing	: ON
Smoothing aperture	: 5%
Input port	: R
Format	: LOGMAG
Input attenuator	: 0dB
Amplifier	: 16dB

③ Set the frequency range and the resolution band width as follows.

Start frequency	: 200kHz
Stop frequency	: 500kHz
Resolution band width	: 10kHz

④ Sweep the frequency once using the SINGLE sweep mode.
Sum up the results of measurement data from the first point to the 1201th point and divide it by 1201.

$$\text{Noise floor} = \frac{\text{MEAS (1)} + \text{MEAS (2)} + \text{--- +} \text{MEAS (1201)}}{1201}$$

MEAS (n) : the measurement data at the nth point

⑤ <Check> : The noise floor (dB) ≤ -102(dBm)

⑥ Change the frequency range as follows.

Start frequency	: 500kHz
Stop frequency	: 150MHz

⑦ Perform the same calculation described in the step ④.

⑧ <Check> : The noise floor (dBm) ≤ -112(dBm)

⑨ Change the resolution band width to 3kHz, 1kHz, 300Hz, 100Hz and check that these satisfy the specs in each frequency range.
The value of the noise floor at each frequency range and the resolution band width is shown in the table below.

RBW / FREQ	10kHz	3kHz	1kHz	300Hz
minf to 500kHz	minf = 200kHz -102dBm	minf = 60kHz -107dBm	minf = 20kHz -112dBm	minf = 6kHz -117dBm
500kHz to 300MHz	-112dBm	-117dBm	-122dBm	-127dBm

⑩ For model with Option 11, perform the same tasks for the Input Port A and the Input Port B.
For model with Option 10, perform the same tasks for the Input Port A.

3.10 Crosstalk (between the input and output)

Testing procedure

① Nothing should be connected to the R3754 Series.

② Set the R3754 Series as follows.
(Other settings should be left at default values.)

Output level	:	0dBm
Number of measurement points	:	1201
Smoothing	:	ON
Smoothing aperture	:	5%
Input port	:	R
Format	:	LOGMAG
Input attenuator	:	100kHz or less : 0dBm 100kHz or more : AUTO
Resolution band width	:	100Hz

③ Set the frequency range as follows.

Start frequency	:	10kHz
Stop frequency	:	500kHz

④ Sweep the frequency once using the SINGLE sweep mode and obtain the data by using MAX search.

⑤ <Check> : [0(dBm) - the measurement value (dBm)] : 105dB or more

⑥ Perform the same tasks and check that they satisfy the specs in the frequency range described below.

<Check> : When 500kHz to 150MHz,
[0(dBm) - the measurement value (dBm)] : 120dB or more

⑦ For model with Option 11, perform the same tasks for the Input Port A and the Input Port B.
For model with Option 10, perform the same tasks for the Input Port A.

3.11 Crosstalk (between the inputs) ----- Only for model with Option 10/Option 11

Testing procedure

① Connect the BNC cable to the R3754 Series as shown in the figure below.
And connect the BNC terminator to the R3754 Series as shown in the figure below.

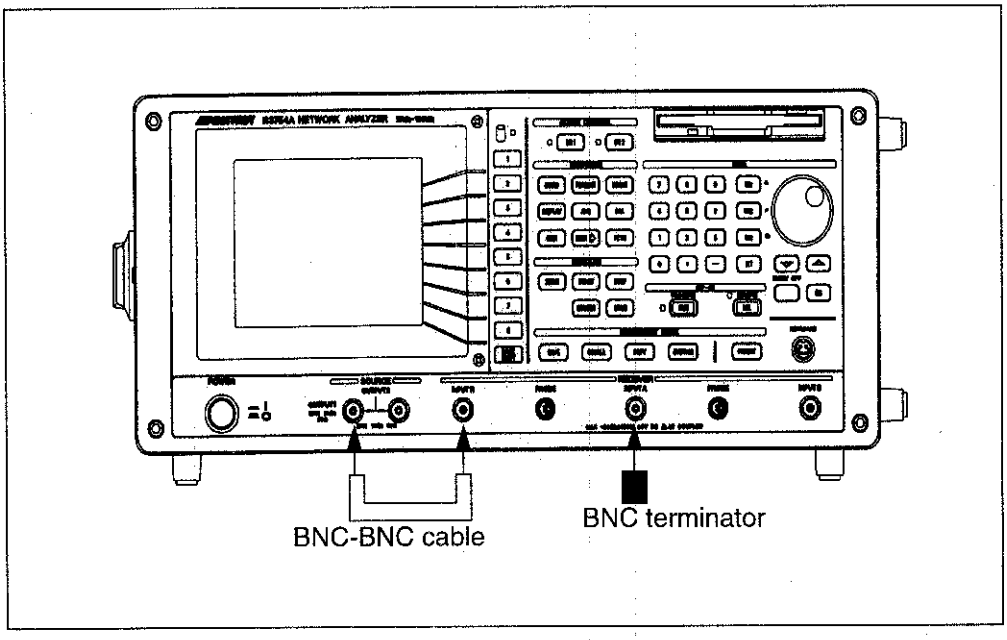


Figure 3-10 Crosstalk (Between the Inputs)

② Set the R3754 Series as follows. (Other settings should be left at default values.)

Output level	: 0dBm
Output port	: OUTPUT1
Input port	: A/R
Format	: LOGMAG
Number of measurement points	: 1201
Smoothing	: ON
Smoothing aperture	: 5%

③ Set the frequency range, the resolution band width and the input attenuator as follows.

Start frequency	: 10kHz
Stop frequency	: 500kHz
Resolution band width	: 30Hz
Input attenuator	: Rch AUTO Ach 0dB

④ Sweep the frequency once using the SINGLE sweep mode and obtain the data by using MAX search.

⑤ <Check> : When 20kHz to 500kHz,
(- the measurement value) : 105dB or more

⑥ Set the frequency range, the resolution band width and the input attenuator as follows.

Start frequency : 500kHz
Stop frequency : 150MHz
Resolution band width : 100Hz
Input attenuator : Rch AUTO
Ach AUTO

⑦ Sweep the frequency once using the SINGLE sweep mode and obtain the data by using MAX search.

⑧ <Check> : When 500kHz to 150MHz,
(- the measurement value) : 120dB or more

⑨ For model with Option 11, execute the B/R measurement and the A/B measurement, referring to the above steps.

- When executing the B/R measurement, connect the BNC terminator to Bch and connect the BNC cable to Rch.
- When executing the A/B measurement, connect the BNC terminator to Ach and connect the BNC cable to Bch.

When performing the measurements, set the input attenuator as described in the table below.

Frequency range	B/R measurement	A/B measurement
10kHz to 500kHz	R : AUTO B : 0dB	B : AUTO A : 0dB
500kHz to 150MHz	R : AUTO B : AUTO	B : AUTO A : AUTO

4 SPECIFICATIONS

Note: ***If there are no other descriptions, these specifications are applied to the temperature range of 23°C ± 5°C***

(1) Measurement function

Measurement channel		2 channels (4 trace display)	
Measurement parameter		R	
		A/R, R, A	Option 10
		A/R, B/R, A/B, R, A, B	Option 11
Measure-ment format	Rectangular display	Log/linear magnitude, phase, group delay, the real part and the imaginary part of a complex parameter |Z|, R, X (When performing the measurement of the Impedance conversion) |Y|, G, B (When performing the measurement of the admittance conversion) Phase extension display	
	Smith chart	The marker provides readouts of Log/linear magnitude, Phase, the real part + the imaginary part, R + jX, G + jB	
	Pole coordinate display	The marker provides readouts of Log/linear magnitude, phase, the real part + the imaginary part	

(2) Source characteristics

Frequency characteris-tics	Range	10kHz to 150MHz	
	Resolution	0.1Hz	
	Accuracy	±5ppm	
		±1ppm, 1MHz or more (0 to 50°C, 30 min. or later after the power-on)	Option 20
	Stability	$\pm 2\times10^{-8}$ per day (48 hour after the power-on)	Option 20
Output power char-acteristics	Range	+21dBm to -43dBm	
	Resolution	0.1dB	
	Accuracy	±0.5dB (0dBm, 10MHz)	
	Linearity (10MHz)	+21dBm to -35dBm ±0.5dB	
		-35dBm to -43dBm ±1.5dB	
	Flatness (0dBm output)	10kHz to 300kHz ±2.0dB	
		300kHz to 150kHz ±1.5dB	
	Impedance (Output port 1)	Nominal 50Ω Return loss 13dB or more (0dBm, typical)	

Spectral purity	Harmonic distortion	≤ -15dBc	
	Non-harmonic spurious signal	≤ the bigger one of -20dBc or -60dBm	
	Phase noise	≤ -95dBc/Hz (10kHz offset)	
Sweep characteristics	Sweep parameter	Frequency, signal level	
	Range	Frequency sweep: Same as the frequency characteristics	
		Level sweep: +21dBm to -43dBm	
	Range setting	Start/stop or center/span	
	Sweep type	Linear sweep and logarithmic sweep, available for a user-specified segment, level sweep	
	Sweep time	0.05ms/point (RBW 15kHz)	
	Measuring point	3, 6, 11, 21, 51, 101, 201, 301, 401, 601, 801, 1201 points	
	Sweep trigger	Repeat, single, external	
	Sweep mode	Dual sweep (Sweeps frequency for each channel in the same frequency range.)	
		Alternate sweep (Sweeps frequency for each channel in different sweep ways and different frequency ranges.)	
Output format	Output	Single	
		Single, dual	Options 10 and 11
	Connector	Type BNC female, 50Ω	
	Power splitter (Output port 2)		Options 10 and 11
	Insertion loss	6dB (typical)	
	Amplitude tracking	< 100MHz 0.1dB (typical)	
		≥ 100MHz 0.2dB (typical)	
	Equivalent output SWR	< 100MHz 1.2 (typical)	
		≥ 100MHz 1.4 (typical)	

(3) Receiver characteristics

Input characteristics	Input channel	1-channel	
		2-channel	Option 10
		3-channel	Option 11
	Frequency range	10kHz to 150MHz	
	Impedance	Nominal: 50Ω	
	Return loss	ATT0dB 20dB or more	
		ATT25dB 25dB or more	
	Maximum input level	ATT25dB AMP0dB +5dBm	
		ATT0dB AMP0dB -20dBm	
		ATT0dB AMP16dB -36dBm	
	Input damage level	+24dBm, ±3VDC	
	Noise level ATT0dB AMP16dB	RBW10kHz 200kHz to 500kHz -102dBm 500kHz to 150MHz -112dBm	
		RBW3kHz 60kHz to 500kHz -107dBm 500kHz to 150MHz -117dBm	
		RBW1kHz 20kHz to 500kHz -112dBm 500kHz to 150MHz -122dBm	
		RBW300Hz 10kHz to 500kHz -117dBm 500kHz to 150MHz -127dBm	
	Resolution bandwidth (RBW)	15kHz to 3Hz (1, 1.5, 2, 3, 4, 5, 7 steps)	
	Input crosstalk	10kHz to 500kHz 105dB	
		500kHz to 150MHz 120dB	
	Source crosstalk	10kHz to 500kHz 105dB	
		500kHz to 150MHz 120dB	
	Input connector	Type BNC female, 50Ω	
Automatic offset calibration	Normalize function	Reduces the frequency characteristics of a measurement system.	
	Electrical length correction	Equivalent electric length or group delay time can be added to the measured phase and group delay time.	
	Range	-3×10^9m to $+3 \times 10^9$m or +10sec to -10sec	

Magnitude characteristics (Absolute characteris-tics)	Measurement range (RBW 1kHz)	ATT AUTO AMP 0dB	+5dBm to -115dBm	
		ATT 25dB AMP 0dB	+5dBm to -90dBm	
		ATT 0dB AMP 0dB	-20dBm to -115dBm	
		ATT 0dB AMP 16dB	-36dBm to -122dBm	
	Display resolution	0.001dB/div		
	Accuracy	±0.5dB (10MHz, maximum input level)		
	Frequency response (0dBm input)	10kHz to 1MHz	4dBp-p	
		1MHz to 150MHz	3.5dBp-p	
	Dynamic accuracy (ATT 25dB, AMP0dB) (100kHz or higher)	0 to -10dBm	±0.4dB	
		-10 to -60dBm	±0.1dB	
		-60 to -70dBm	±0.2dB	
		-70 to -80dBm	±0.6dB	
Magnitude characteristics (Relative characteris-tics)	Measurement range (ATT25dB AMP0dB) (100kHz or higher)	ATT AUTO AMP 0dB	±120dB	Options 10 and 11
		ATT 20dB AMP 0dB	±95dB	
		ATT 0dB AMP 0dB	±95dB	
		ATT 0dB AMP 16dB	±86dB	
	Display resolution	0.001dB/div		
	Accuracy	±0.5dB (10MHz, maximum input level)		
	Frequency response (0dBm input)	10kHz to 1MHz	3dBp-p	
		1MHz to 150MHz	2dBp-p	
	Dynamic accuracy (ATT 25dB, AMP0dB) (100kHz or higher)	0 to -10dBm	±0.1dB	
		-10 to -60dBm	±0.05dB	
		-60 to -70dBm	±0.1dB	
		-70 to -80dBm	±0.3dB	
		-80 to -90dBm	±0.9dB	

Phase characteristics * (Absolute characteristics)	Measurement range	±180° (The phase extending function enables the display to trace data over ±180° continuously.)	
	Display resolution	0.01dB/div	
	Dynamic accuracy (ATT 25dB, AMP0dB) (100kHz or higher)	0 to -10dBm ±3.0°	
		-10 to -50dBm ±1.5°	
		-50 to -60dBm ±2.0°	
		-60 to -70dBm ±2.4°	
		-70 to -80dBm ±3.6°	
Phase characteristics (Relative characteristics)	Measurement range	±180° (The phase extending function enables the display to trace data over ±180° continuously.)	Options 10 and 11
	Resolution	0.01°	
	Frequency response (0dBm input)	10kHz to 1MHz 20°p-p	
		1MHz to 150MHz 15°p-p	
	Dynamic accuracy (ATT 25dB, AMP0dB) (100kHz or higher)	0 to -10dBm ±1.0°	
		-10 to -50dBm ±0.3°	
		-50 to -60dBm ±0.5°	
		-60 to -70dBm ±1.0°	
		-70 to -80dBm ±3.0°	
		-80 to -90dBm ±8.0°	
Delay characteristics (Relative characteristics)	Range	The following formula is used to determine the range. $r = \frac{\Delta\phi}{360 \times \Delta f}$ $\Delta\phi$: Phase Δf: Aperture frequency (Hz)	
	Measurement range	1ps to 250s	
	Group delay resolution	1ps	
	Aperture frequency	Corresponds to the Δf. Can be set from {100/(measurement points - 1) x 2 %} of the frequency span to {100/(measurement points - 1) × 100 %} of the frequency span, with the resolution of {100/(measurement points - 1) × 2 %}.	
	Accuracy	$\frac{\text{phase accuracy}}{360 \times \text{aperture frequency (Hz)}}$	

In the absolute mode, the phase measurement can be executed within measurement ranges as follows.

① 10 kHz ≤ measurement frequency ≤ 34 MHz

② 31 MHz < measurement frequency ≤ 150 MHz.

Error calibration function	Normalize	Corrects the frequency response (of magnitude, phase) in the transmission measurement.	
	One port calibration	Corrects the errors caused by the bridge directivity, the frequency response and the source match in the reflection measurement. Short, open and load standards are required for the error correction.	
	Data averaging	Averages the data (vector values) at each sweep. The averaging number can be set between 2 to 999.	
	Transmission full calibration	The transmission normalize enables the high accuracy measurement on transmission measurement. The short and load standards are required for the error correction.	

(4) Connection with external instruments

Signal output for an external display	15 pin D-SUB connector (VGA)	
GP-IB data output and Remote control	IEEE488 applicable	
Printer port	25-pin D-SUB	
Serial port	RS-232 compatible (9-pin D-SUB)	
Keyboard	IBM PC-AT compatible	
External reference frequency input	Applicable input signal is Frequency: 1, 2, 5, 10MHz ± 10ppm, 0dBm (50Ω) or more	
Parallel I/O output	TTL level, 8-bit output (two ports) 4-bit input and output (two ports)	Option 01
Probe power	±12V	Options 10 and 11
External trigger signal input	BNC connector (female)	

(5) Display section

Indicator	R3754A 5-inch monochrome liquid-crystal display
	R3754B 6.5-inch color TFT liquid-crystal display
Resolution	640 × 480 dots
Display mode	Rectangular log/linear coordinates, polar coordinate, Smith chart (Impedance/admittance display)
Display format	Single channel display, dual channel display (which shows plural traces together or respectively.)
Measurement condition display	Start/stop, center/span, scale/DIV
	Reference level, marker value, soft key function
	Warning message
Position of Reference line	The top (100%) to the bottom (0%) of the vertical axis
Auto scale	Optimizes the reference value and the scale to show the traced data best in the screen.
Brightness	R3754A: Not applicable
	R3754B: The back-light can be turned on/off.
Contrast	R3754A: Adjustable

(6) Marker function

Marker display	The readout of the marker can be converted to the display value conforming to the measurement format.
Multi marker	Ten markers can be set for each channel, respectively.
Delta marker	Any one of the ten markers can be specified as a reference marker and can measure the delta value between a movable marker and the reference marker.
Marker couple	The marker of each channel can be set as a coupling marker or an independent marker.
Analysis of arbitrary specified zone	The marker search function can be performed in a segment specified by the delta marker function.
MKR search	MAX search, MIN search, NEXT search
Marker tracking	Performs the search for each sweep.
Target search	Calculates a XdB-down band width, a center frequency, Q value and so on. It is also possible to search for the frequency of the phase 0° or the frequency band of ±X°.
MKR →	MKR → the reference value, MKR → START, MKR → STOP, MKR → CENTER
Limit line function	Limit line can be set up to 31 segments. Each segment can be judged by the pass/fail criteria.
Direct analysis function	Resonator analysis etc.

(7) Instruments state function

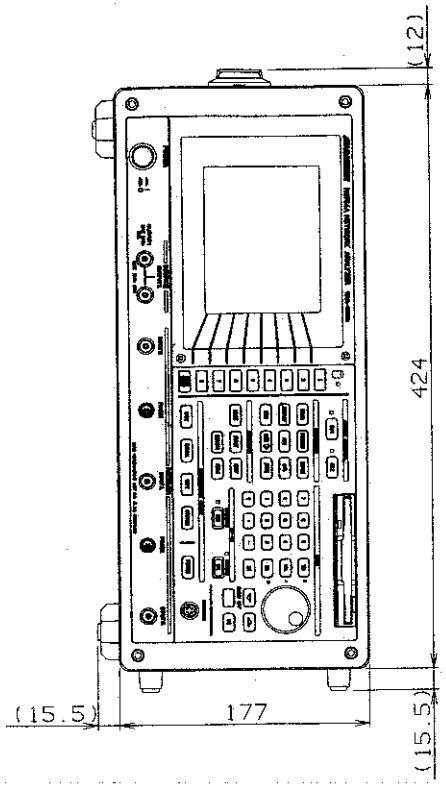
Save register	The set condition and the CAL data can be saved in the internal memory which is keeping backup.
Data save/recall	Each kind of data can be stored by using a floppy disk which is standard.

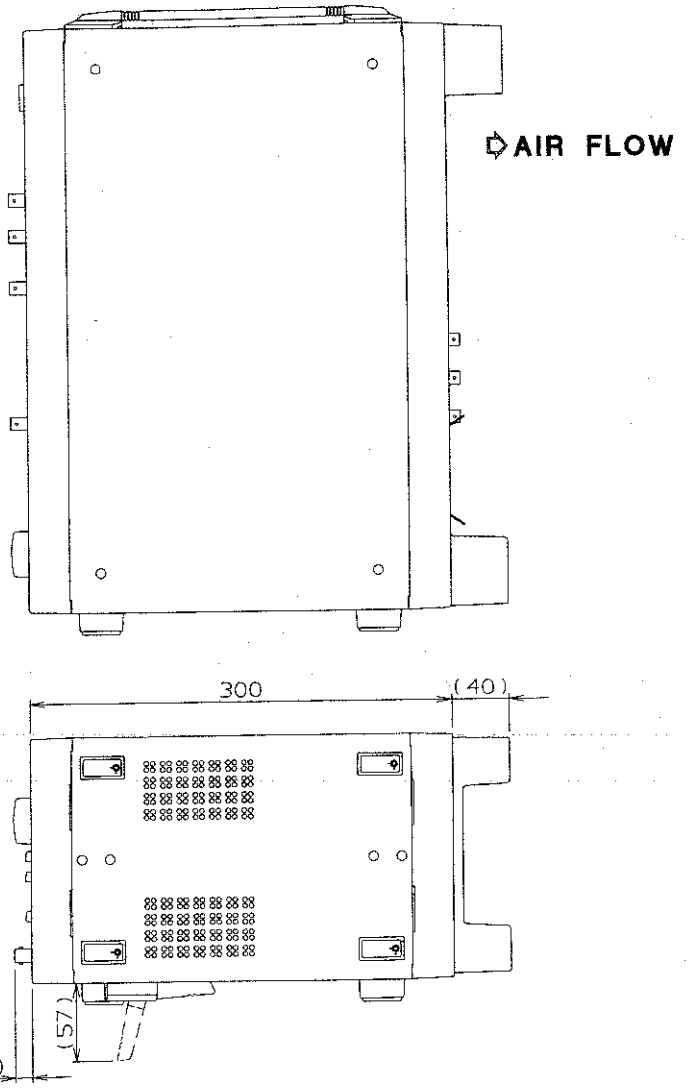
(8) Programming function

BASIC controller function	Controls this R3754 Series itself and instruments equipped with GPIB interface functions. This is a built-in standard controller function.
Built-in function	Enables the high speed analysis of the measurement data.
FDD function	MS-DOS format compatible. Recording capacity: DD 720kB HD 1.2MB, 1.44MB

(9) General specification

Operating conditions	When disk drive is in operation	Temperature: +5°C to +40°C Humidity (without condensation): 80% or less
	When disk drive is not in operation	Operating temperature range: 0°C to +40°C (R3754A) 0°C to +50°C (R3754B) Humidity (without condensation): 80% or less
Non-operating conditions		-20°C to +60°C
Power supply		AC100V to 120V, AC220V to 240V at 50/60Hz Automatically switched to the AC100 family or the AC200V family.
Power consumption		200VA or less
Cabinet dimensions		Approx. 424mm(W) × 177mm(H) × 300mm(D)
Mass		12kg or less





Unit : mm

CAUTION
This drawing shows external dimensions
this instrument.
The difference in products and options
used can cause a change in the appearar
of the instrument.

DIMENSIONAL OUTLINE DRAWING

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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.

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