ADVANTEST®

ADVANTEST CORPORATION

R3764/66H Series

Network Analyzer

Operation Manual

Applicable models
R3764AH
R3764BH
R3764CH
R3766AH
R3766BH
R3766CH
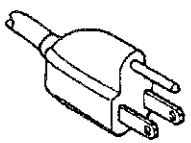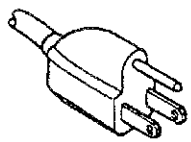
Table of Power Cable Options

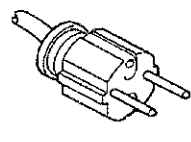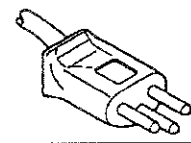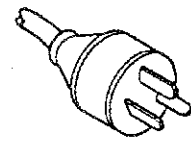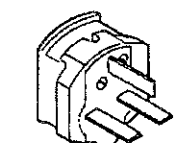There are six power cable options (refer to following table).

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 explains all processes from the acceptance to actual operation of network analyzer R3764/66H series. The three related manuals for the R3764/66H series is shown below.

Manual name	Model	Strong points	Remarks
R3764/66H Series Network Analyzer Operation Manual (this manual)	R3764AH	S parameter can be connected.	3.8GHz model
	R3764BH	Bridge is built in.	
	R3764CH	S parameter is built in.	
	R3766AH	S parameter can be connected.	8.0GHz model
	R3766BH	Bridge is built in.	
	R3766CH	S parameter is built in.	
R3764/65/66/67H Series Network Analyzer Programming Manual (separate volume)	This manual is common to all models of R3764/66H series.		
R3752/53/64/65/66/67H Series Network Analyzer Programming Guide (separate volume)	This manual is commom to all models of R3764/66H series.		

<Caution>

ADVANTEST reserves the right to change the contents of this manual and other product information without notice.

Do not reproduce and do not reprint all of this manual or part without permission ADVANTEST Corporation.

The address and the telephone number of ADVANTEST Corporation are described at the end of this manual. Refer for the inquiry etc.

<How to Use this Manual>

(1) Notation of panel keys and soft keys in this manual

An explanation about the Keyboard keys versus the R3764/66H Front Panel is included in "7. PERFORMANCE TEST" of this manual. The key notation is as follows:

R3764/66H Panel key : (Example) **[MEAS]**, [1]
R3764/66H Soft key   : (Example) *{REFLECTION}, {NORMALIZE (SHORT)}*
Input from keyboard : (Input formats with the R3764/66H keyboard are also shown.)
                       (Example) *Ctrl F1*

(2) Mark of caution level in this manual

DANGER!
Uses it for the case with the possibility of the body trouble and the death.

WARNING!
Uses for the remarks concerned with the safety of the body.

CAUTION!
Uses for the remarks of the damage or fire of the machine equipment, or for the restriction of use.

REFERENCE
Information helpful to you.

Note: Uses to explain for the supplementation.

(3) Notation for the last page

This manual has the page attaching the sign of (*) to the upper right of the page number. The sign of (*) informs the final page of each chapter.

(4)   Organization of this manual

Configuration	Contents	Remarks
Preface	For the first use. Confirmation of the products and the attachments.	Read before first use.
Contents	Table of Contents, Figures, Tables The configuration and the page of the description.	Use to find necessary information easily.
1.	GETTING STARTED From setting to setup, cautions, cleaning, transportation and storage.	Be sure to read this manual when using for the first time.
2.	Explanation of the panel and display screen Names of each device, function and operation. Description of display screen.	Usage of the R3764/66H series can be understood by reading it through.
3.	Basic operating guidelines Actual example of operation. How to look at the display screen.	
4.	Basic operation Description of the basic items.	See if necessary.
5.	In abnormalities Diagnostics and error message.	
6.	Operating principles Basic operation and flow chart.	
7.	Performance test	
8.	Specifications Technical information and general information.	
Appendix	Relation of data between each function Initial setting. Panel emulation with keyboard connected.	
Index	Main terms and the description page.	Used to find necessary information easily.
Others	External view	Used to find the outer dimensions.

\<Confirmation of Product and Attachment\>

When you unpacking, confirm 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
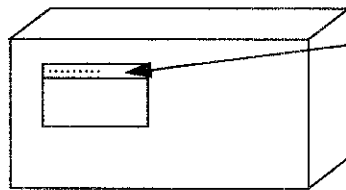
Type and name of product.

Confirm that the product is the same as the one ordered from the name plate in the front panel.

(2)   Standard attachment lists.

Note: Order the addition of the attachment etc. with type name or stock No.

Name of articles	Parts code	Quantity	Remarks
Power cable	*1	1	3pins plug
AC adapter	JCD-AL003EX03	1*2	3→2pin
Power fuse	DFT-AA6R3A	2	T6.3A/250V
R3764/66H SERIES Operation Manual	ER3764/66H SERIES	1	English
Programming manual	ER3764H (PM)	1	English
Programming guide	ER3752/64H (PG)	1	English
Editor install disk	PR37670001-FK	1	HD 1.44M bytes
Sample program disk	PR37670003-FJ	1	DD 720k bytes

*Note: *1 : ADVANTEST provides the power cables for each country. See yellow page of "Table of Power Cable Options" of this manual.*
*   *2 : The AC adapter is a standard attachment only to Japan-domestic.*

<Option, Accessory and Recommended Kit (Extra-cost)>

(1) Option

Name	Type	Remarks
Output attenuator	Option 10	0 to 70dB
8GHz output amp	Option 11	R3766AH/BH/CH only

(2) Accessory

Name	Type	Remarks
S parameter test set	R3961B	300kHz to 3.6GHz
Duplexer test set	R3961T	
Rack-mount kit	A02713	JIS (Front handle attached)
	A02712	EIA (Front handle attached)
Slide rail set	A02642	

(3) Recommended kit

Name	Type	Remarks	
		Frequency range	Connector type
Calibration kit	Model 9617A3	DC to 18GHz	N type
Calibration kit	Model 9617F3	DC to 18GHz	3.5mm type
Calibration kit	Model 9617C3	DC to 4GHz	N type
Calibration kit	Model 9617H3	DC to 4GHz	3.5mm type

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

1   GETTING STARTED

This chapter gives a brief explanation of product, its working environment and operational precautions. Be sure to read this chapter before you use the product.

1.1   Product Description

The R3764/66H series is the 3.8GHz/8GHz 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 0.15ms/points high-speed measurement at a resolution bandwidth (RBW) of 10kHz, 100dB wide dynamic-range measurement, and two-device simultaneous measurement with four-channel/eight-trace display.

Also, we have added the program sweeping function that can freely change the resolution bandwidth (RBW) and output level during sweep operation for each segment.

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

- In the case of C type, 4 S parameters can be displayed in a screen by 0.15ms/point high-speed frequency sweeping and four-channel/eight-trace (RBW 10kHz).
- 0.15ms/point high-speed level sweeping.

(2)   Wide dynamic range

- 100dB wide dynamic range.

(3)   Program sweeping function.

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

(4)   MS-DOS formatted disk

- By using an MS-DOS personal computer, it is possible to easily create programs and analyze data because of the disk conformed to the MS-DOS format standard.
- Three modes of storage capacity are available (DD 720KB, HD 1.2MB and HD 1.4MB).

1.2 Environmental Conditions

• Operating Environment
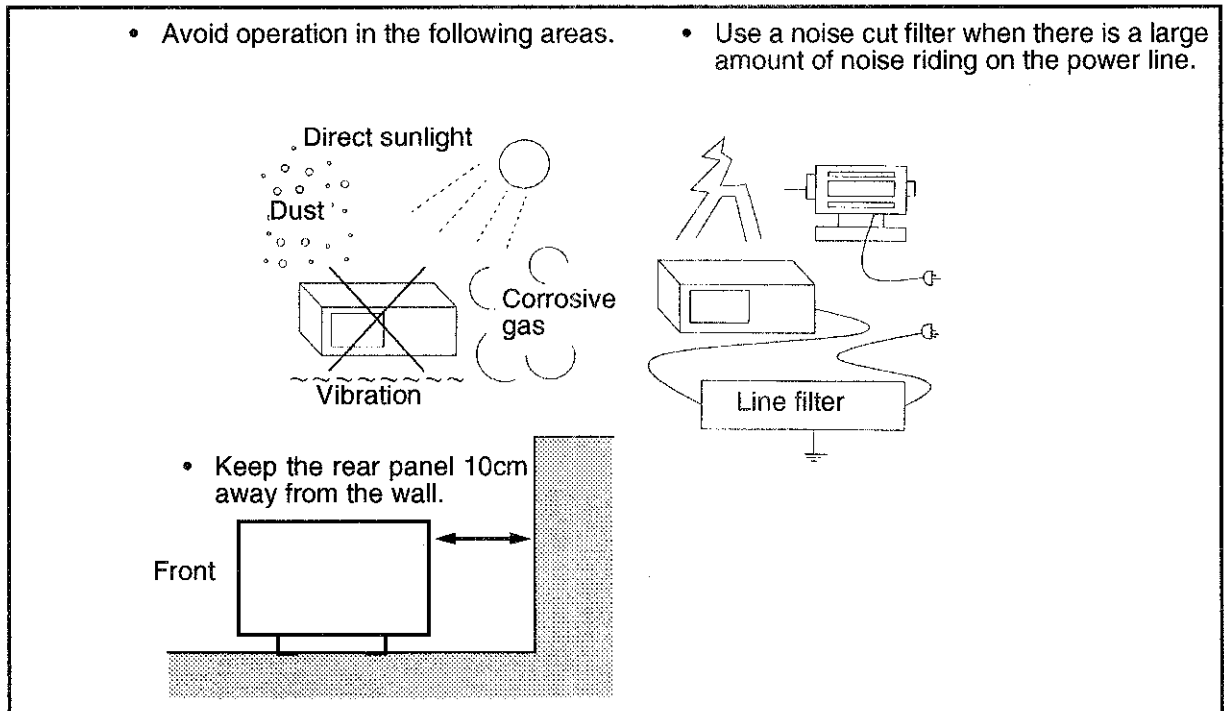
Figure 1-1 Operating Environment

The R3764/66H series should be installed in an area which satisfies the following conditions:

• Ambient temperature : +5°C to +40°C (Operating temperature range: When FDD is used.)
  0°C to +50°C (Operating temperature range: When FDD is not used.)
  -20°C to +60°C (Storage temperature range)

• Relative humidity : PH80% or less (no condensation)

• An area free from corrosive gas

• An area away from direct sunlight

• A dust-free area

• An area free from vibrations

• A low noise area
  Although the R3764/66H 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.

For highly accurate measurement, turn the power ON after the R3764/66H series temperature has reached the room temperature level, and warm up the R3764/66H series for 60 minutes.

• Installation position
  The R3764/66H 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.

1.3   Supply Description

1.3.1   Power Supply Specifications

WARNING!
Safety use the R3764/66H series according to the power requirement.
The R3764/66H series might be damaged in the case not following the power requirement.

The power requirement of the R3764/66H series is shown in the following.
Use the power supply by which the power requirement of the R3764/66H series is satisfied.

	$100V_{AC}$ operation	$220V_{AC}$ operation
Input voltage range	90V - 132V	198V - 250V
Frequency range	48Hz - 66Hz	
Power fuse	T6.3A/250V	
Power consumption	300VA or below	

*The supply voltage of the R3764/66H series is automatically changed over (100/240V).

1.3.2   Replacing the Power Fuse

WARNING!
1. *Before replacing the power fuse, be sure to turn the power switch OFF and remove the power cable from the outlet.*
2. *For continued protection against fire hazard, use a fuse of the type and rating which match the supply voltage.*

Power fuse is located in the power connector on the rear panel.
To check or replace the power fuse as follows.

| To take out the fuse in the power connector at the rear panel. | To restore the fuse after confirmed or exchanged. |

Standard of fuse
T6.3A/250V

Draw it out by using
the minus diriver.

1.3.3 Connecting the Power Cable

WARNING!
1. Power cable
- *Use power cable of the attachment for prevention of electric shock and fire.*
- *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, hold 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.*
- *ADVANTEST provides the power cables for each country. See yellow page of "Table of Power Cable Options" at this manual.*

1.4 FET Probe

(1) Setup

AH Type   BH/CH Type
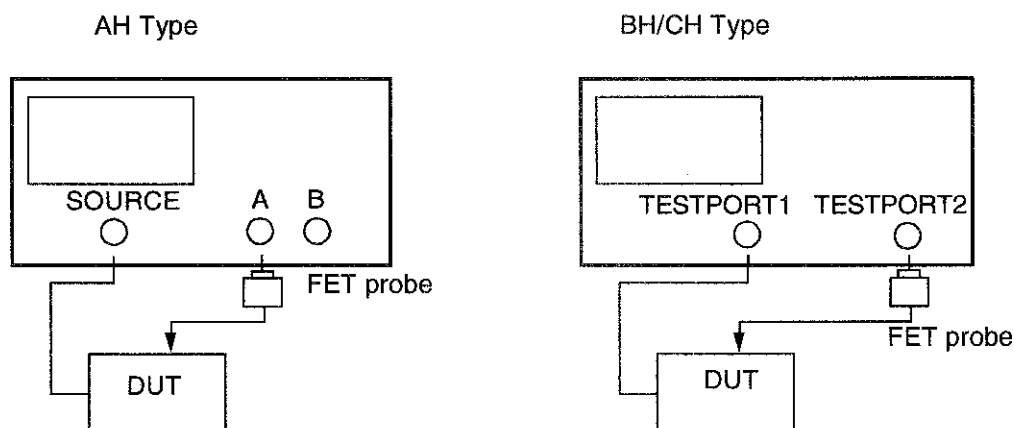
Figure 1-2 Connecting FET Probe

(2) Usage Precautions

The stability and repeatability of the measurement value are affected by the ground of FET prove tip. In high frequency, it is necessary to consider the effect of parallel capacitance. The input impedance of the FET probe is listed in the following Table.

Model name	Input impedance	Remarks
P6201 type	100kΩ ±1% parallel 3PF Attenuator head 1MΩ ±1%, 1.5PF in parallel.	DC to 900MHz Manufactured by SONY Tektronix
P6202A type	10MΩ ±2% Approx. 2PF Approx. 4PF with the optional coupling cap.	DC to 500MHz Manufactured by SONY Tektronix

(3) Calibration and Measurement Method

Operation procedure

① Connect the FET probe to the reference point of the device under test.

② Select the calibration menu of the R3764/66H series to normalize the frequency characteristic probe.

③ Connect the FET probe to the point to be measured, then perform the measurement.

Note : When measuring the point in high frequency, note that the data repeatability will be changed by the ground condition of the FET probe tip.

1.5　System Setup Cautions

1.5.1　Notes on the use of Parallel I/O Ports

(1)　In +5V power output from parallel I/O port, maximum current capacity is 100mA. Use it with less than 100mA.

(2)　In +5V power output from parallel I/O port, there is a fuse.
The fuse is belown with the over current of 100mA or more.
In the case with which the fuse is belown, contact to the nearest dealer or the sales and support offices.

(3)　Use the shield cable for the cable for parallel I/O port. (To prevent malfunction by noise)

(4)　The standard of the cable for the radiation test of the R3764/66H series is MO-27 (unbundled).

(5)　Do not bundle I/O cable and AC power lines when wiring.

1.5.2　Notes on the use of Serial I/O ports

(1)　The length of the cable used for serial I/O port is 15m or less.

(2)　Use the shield cable for the cable for serial I/O port. (To prevent malfunction by noise)

(3)　The standard of the cable used for the radiation test of the R3764/66H series is A01235 (unbundled).

(4)　Do not bundle I/O cable and AC power lines when wiring.

1.6　Measurement Time

The sweeping time of the R3764/66H series is determined by frequency set-up time and data acquisition time.

As the SWEEP TIME on the display screen shows the data acquisition time, the actual sweep time becomes longer than the displayed SWEEP TIME under the influence of frequency set-up time.

See APPENDIX for details.

1.7　Input Signal Level Overload Cautions

The maximum level at the input part of R3764AH/3764BH and R3766AH/3766BH is 0dBm.

R3764CH/3766CH is +15dBm.

If more than approximately 5dB over the maximum level is input, "Overload" is displayed.

1.8 How to Replace the Protective Fuse for Bias Input

For R3764CH/3766CH type, the protective fuse for TEST PORT input bias is located in the fuse holder on the rear panel. (See sub-section 2.2.3.)

Note: *When the protective fuse for bias input is replaced, turn OFF the POWER switch of the R3764/66H series and remove the power cable from the receptacle beforehand.*
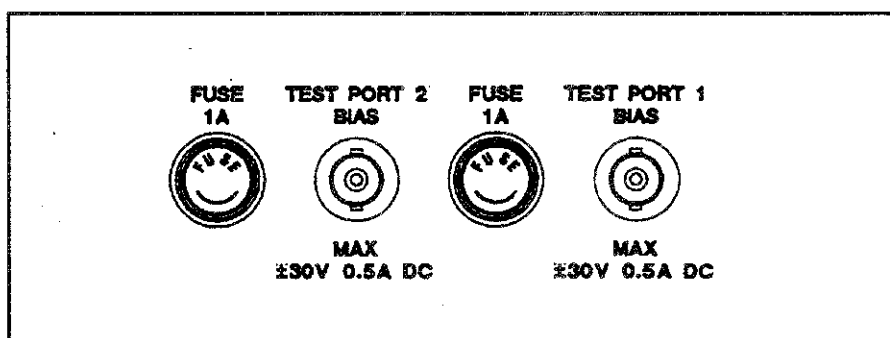
Figure 1-3 Replacement of protective fuse for bias input

Replacement procedure

① Turn the cap of fuse holder counterclockwise to remove.

② Take out this turned part and replace the fuse.

③ Install the turned part.

   Tighten clockwise.

❖ Standard of protective fuse for bias input

   Name of type: TMF51NR1(250)
   Part code   : DFN-AA1A-3
   Rating   : Fast blow, 250V, 1A

WARNING!
When the fuse is replaced, use the same type and the same rating of fuse to protect against the danger of fire.

1.9 Cleaning, Storage and Transportation

(1) Cleaning

Wipe the dirt of the R3764/66H series off with a soft cloth (or wet cloth). At this time, pay attention to the following points.

* Do not leave the fluff of the cloth and do not soak water into the inside of the R3764/66H series.

* Do not use an organic solvent (for example, benzene and acetone, etc.) which changes plastics in quality.

(2) Storage

Storage temperature of the R3764/66H series is from -20°C to +60°C. Do not store it outside of this temperature range.
The cases in which the R3764/66H series is not used for a long time, cover it 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.

(3) Transportation

When you transport the R3764/66H series, pack it with the original packing materials or equivalents.

Packing procedure

① Wrap the R3764/66H series with cushion material and put it in the cardboard box.

② After putting attachment, put cushion again.

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

1.10 Notes on Use

(1) Before starting the measurement

When turning on the power, don't connect DUT.
Before starting the measurement, check for a proper output power level.

(2) Unpacking the case

The case must be opened by a service man of our company.
The R3764/66H series has high temperature/high pressure parts.

(3) In case of abnormality

When abnormalities such as bad smell, unusual noise, etc. are noticed, turn off the power switch. Pull out power cable from the outlet, and contact our company.
The address and the telephone number of our company are in the end of this manual.

(4) Warm up

After the R3764/66H series temperature has reached the room temperature level, turn the power switch ON and warm it up for 30 minutes.

(5) Electromagnetic interference.

High frequency noise of the small power is generated at the R3764/66H series when they are used.
Therefore, electromagnetic interference is generated to the television or the radio by an improper installation and use of the R3764/66H series.
If the power of the R3764/66H series is turned off, and the electromagnetic interference is reduced, then the R3764/66H series is caused the problems.
Prevent electromagnetic interference by the following procedure.

- Change the direction of antenna of the television or the radio.

- Place the R3764/66H series at the other side of the television or the radio.

- Place the R3764/66H series away from the television or the radio.

- Use another power source for the television or the radio to separate from the R3764/66H series.

(6) Cautions when scrapping the R3764/66H series

When the products are scrapped, be careful to treat them properly.
Call for the inquiry about how to scrap, etc. to the nearest our service station. The addresses and the telephone numbers are at the end of this manual.

Harmful substances : ① PCB (Polychlorinated biphenyl)
② Mercury
③ Ni-Cd (Nickel-cadmium)
④ Others
Substances that contain cyan, organic phosphorous, and hexadic chromium, and substances that might dissolve and flow out cadmium, lead or arsenic. (Except the lead for soldering.)

(7) Life time of the parts

The following consumable parts are used in the R3764/66H series.

Soft key switch	500,000 times of operation

2 PANEL DESCRIPTION

2.1 Front Panel Descriptions

2.1.1 R3764AH/66AH
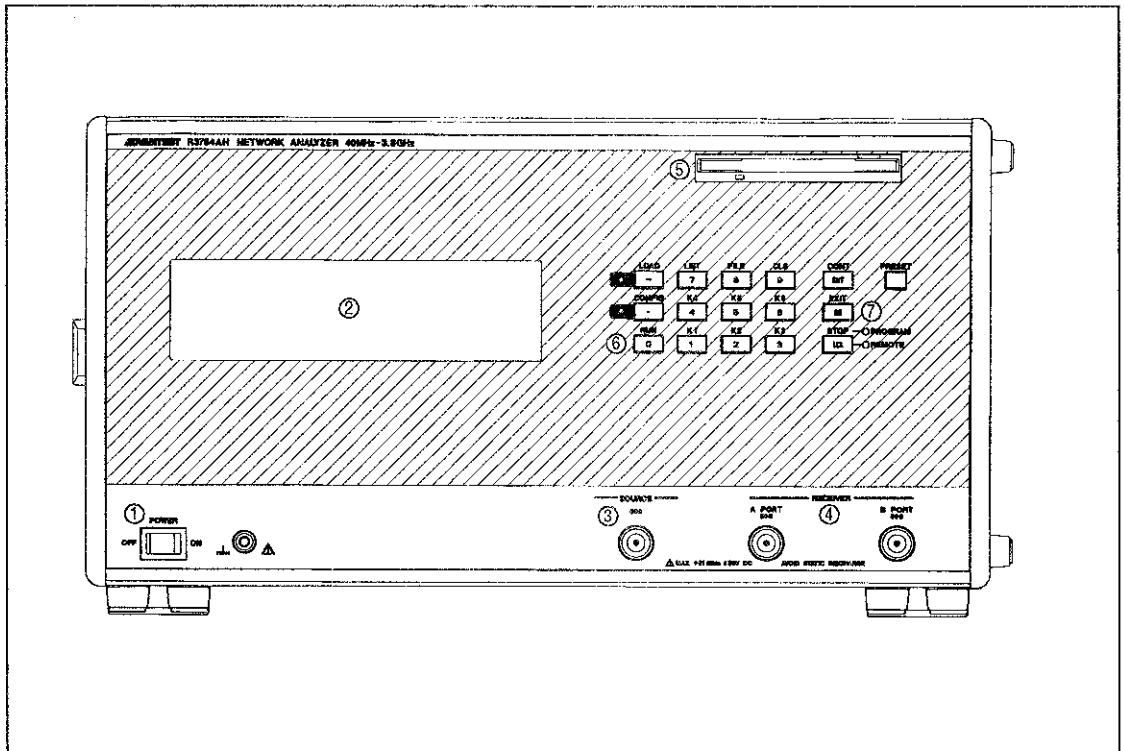
Figure 2-1 Front Panel (R3764AH/66AH)

No.	Name	Description
①	POWER switch	Turns on/off the power.
②	Fluorescent display	Displays the FDD and RAM disk file contents and the program execution results in the area of 32 characters × 8 digits.
③	SIGNAL SOURCE OUTPUT connector (SOURCE)	Power splitter output.
④	RECEIVER SECTION INPUT connector A PORT B PORT	The INPUT connector is used for the reference and measurement input.

2.1 Front Panel Descriptions

No.	Name	Description
⑤	Floppy disk drive	Used to save programs and measurement data. This drive is available in three modes and the format type is 720KB for DD and 1.2 or 1.44MB for HD.
⑥	Panel keys	0 to 9, ., -, BS, NET: Used to input numeric data. K1 to K6: Used as function keys. LOAD, LIST, FILE, CLS, CONT, EXIT, RUN and STOP: Used for program load, execution, stop and so forth.

⑦	LED	Indicates the BASIC execution and GPIB operating states.
		 • PROGRAM LED
		  Goes on when loading a program or saving or loading a file. This LED remains on while the program is being paused.
		 • REMOTE LED
		  Goes on when the R3764/66H series is in remote mode. It goes off after the R3764/66H series has exited the remote mode.

2.1.2 R3764BH//66BH
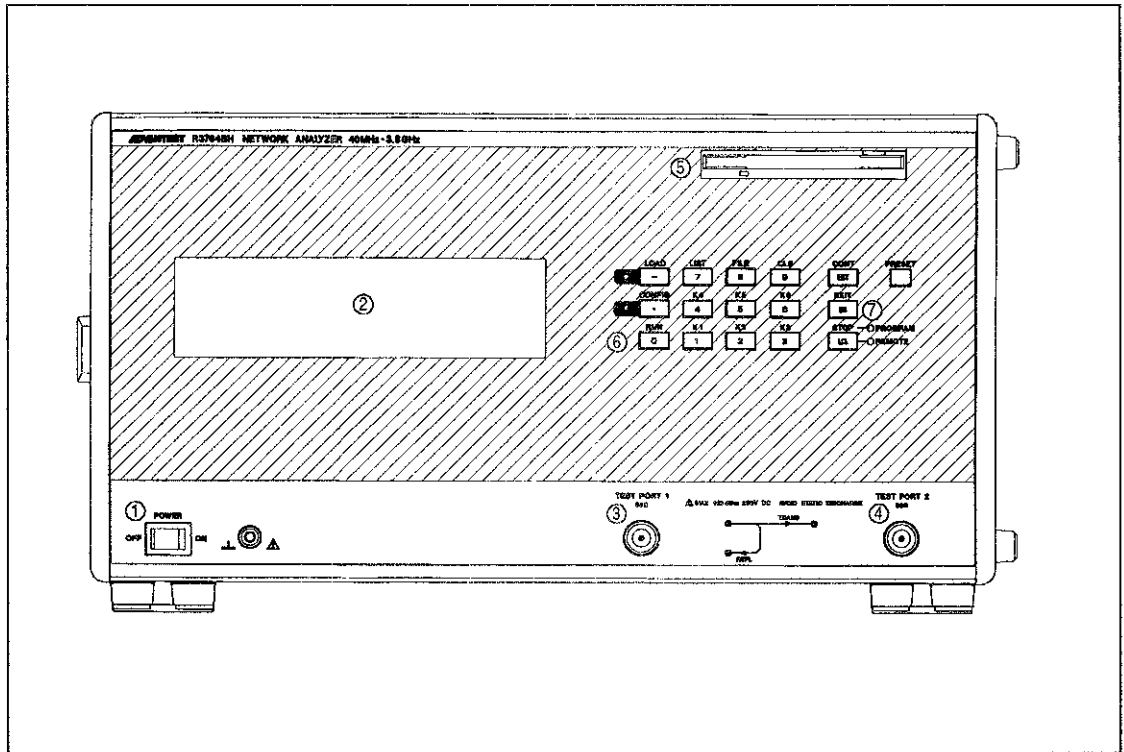
Figure 2-2 Front Panel (R3764BH/66BH)

No.	Name	Description
①	POWER switch	Turns on/off the power.
②	Fluorescent display	Displays the FDD and RAM disk file contents and the program execution results in the area of 32 characters × 8 digits.
③	Reflection characteristic connector TEST PORT 1	Reflection characteristic measurement port.
④	Transmission characteristic connector TEST PORT 2	Transmission characteristic measurement port.
⑤	Floppy disk drive	Used to save programs and measurement data. This drive is available in three modes and the format type is 720KB for DD and 1.2 or 1.44MB for HD.

2.1 Front Panel Descriptions

No.	Name	Description
⑥	Panel keys	0 to 9, ., -, BS, NET: Used to input numeric data. K1 to K6: Used as function keys. LOAD, LIST, FILE, CLS, CONT, EXIT, RUN and STOP: Used for program load, execution, stop and so forth.
⑦	LED	Indicates the BASIC execution and GPIB operating states. • PROGRAM LED Goes on when loading a program or saving or loading a file. This LED remains on while the program is being paused. • REMOTE LED Goes on when the R3752H series is in remote mode. It goes off after the R3752H series has exited the remote mode.

2.1.3 R3764CH/66CH
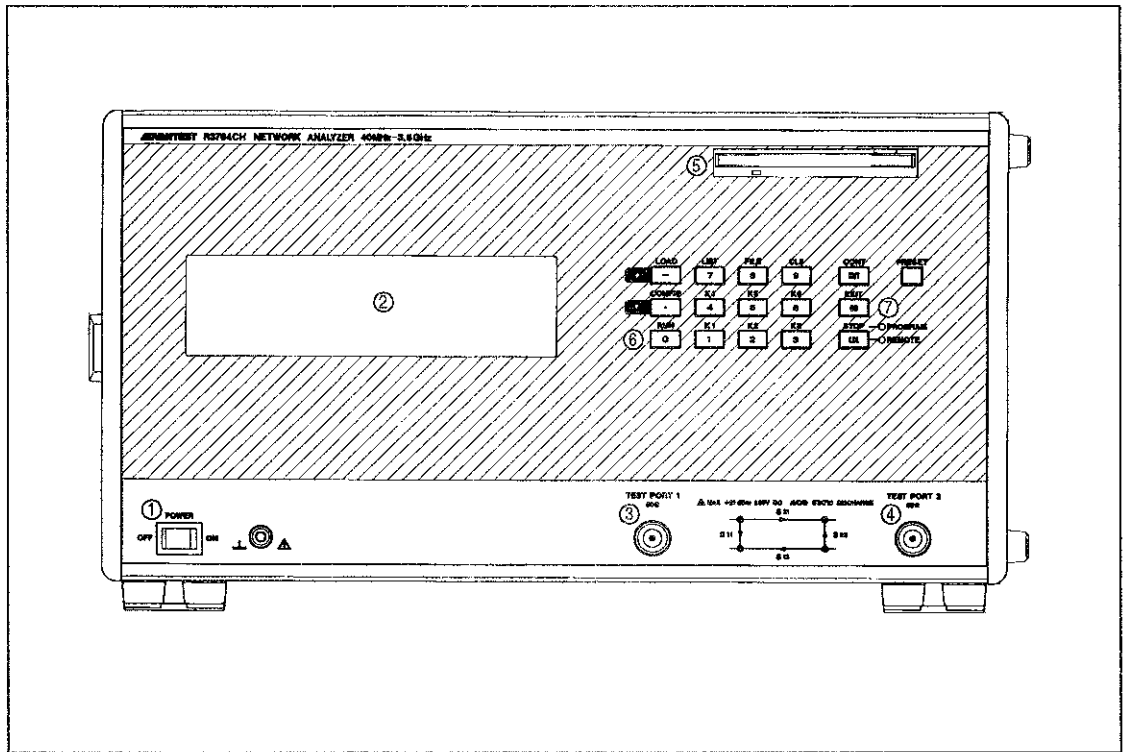
Figure 2-3 Front Panel (R3764CH/66CH)

No.	Name	Description
①	POWER switch	Turns on/off the power.
②	Fluorescent display	Displays the FDD and RAM disk file contents and the program execution results in the area of 32 characters × 8 digits.
③	PORT 1 connector TEST PORT 1	Measurement of PORT 1.
④	PORT 1 connector TEST PORT 2	Measurement of PORT 2.
⑤	Floppy disk drive	Used to save programs and measurement data. This drive is available in three modes and the format type is 720KB for DD and 1.2 or 1.44MB for HD.

2.1 Front Panel Descriptions

No.	Name	Description
⑥	Panel keys	0 to 9, ., -, BS, NET: Used to input numeric data. K1 to K6: Used as function keys. LOAD, LIST, FILE, CLS, CONT, EXIT, RUN and STOP: Used for program load, execution, stop and so forth.
⑦	LED	Indicates the BASIC execution and GPIB operating states. ∘ PROGRAM LED Goes on when loading a program or saving or loading a file. This LED remains on while the program is being paused. ∘ REMOTE LED Goes on when the R3764/66H series is in remote mode. It goes off after the R3764/66H series has exited the remote mode.

2.2 Rear Panel Descriptions

2.2.1 R3764AH/66AH
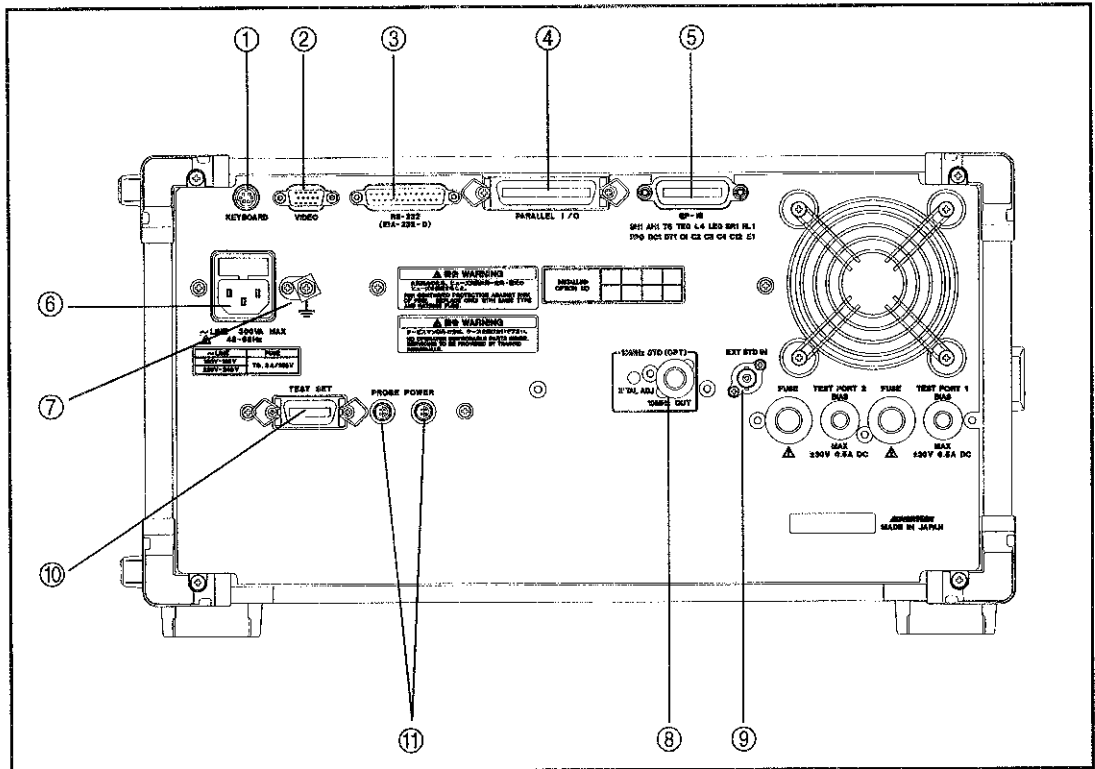
Figure 2-4 Rear Panel Descriptions (R3764AH/66AH)

No.	Name	Description
①	KEYBOARD INPUT connector	Connector to connect PS/2 type (6-pin small size DIN) key board. An external keyboard can be used to input a label name, a saving register name and a BASIC text.
②	VIDEO SIGNAL output	Video signal output correspondence to VGA. (15-pin)
③	SERIAL I/O	Input/output connector conformed to RS-232 standard. (D Sub 25-pin)
④	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) *Use shielded cables for connection (to prevent malfunction by noise).

2.2 Rear Panel Descriptions

No.	Name	Description
⑤	GPIB connector	The GPIB connector is used to remotely control an external peripheral devices and to be remotely controlled by an external controller.
⑥	AC POWER connector	The AC POWER connector has three-pin structure including an earth pin. To remove a power fuse, pull out the upper cover.
⑦	Ground terminal	The ground terminal is used to ground the R3764AH/66AH only when three-pin connector or two-pin adapter for power cable cannot be used.
⑧	Connector for option	Spare connector for option.
⑨	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
⑩	TEST SET connector	Connector for connecting S parameter test-set.
⑪	PROBE POWER connector	Connector for probe power. ±15V output

2.2.2 R3764BH/66BH
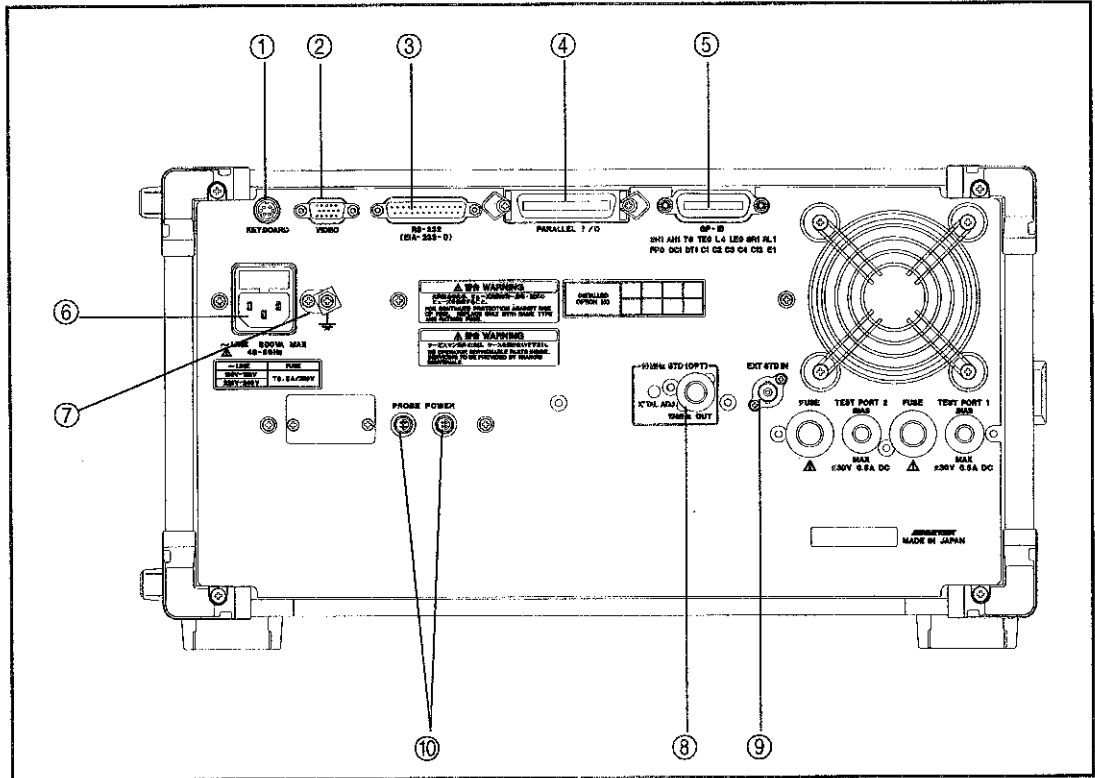
Figure 2-5 Rear Panel Descriptions (R3764BH/66BH)

No.	Name	Description
①	KEYBOARD INPUT connector	Connector to connect PS/2 type (6-pin small size DIN) key board. An external keyboard can be used to input a label name, a saving register name and a BASIC text.
②	VIDEO SIGNAL output	Video signal output correspondence to VGA. (15-pin)
③	SERIAL I/O	Input/output connector conformed to RS-232 standard. (D Sub 25-pin)
④	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) *Use shielded cables for connection (to prevent malfunction by noise).

2.2 Rear Panel Descriptions

No.	Name	Description
⑤	GPIB connector	The GPIB connector is used to remotely control an external peripheral devices and to be remotely controlled by an external controller.
⑥	AC POWER connector	The AC POWER connector has three-pin structure including an earth pin. To remove a power fuse, pull out the upper cover.
⑦	Ground terminal	The ground terminal is used to ground the R3764BH/66BH only when three-pin connector or two-pin adapter for power cable cannot be used.
⑧	Connector for option	Spare connector for option.
⑨	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
⑩	PROBE POWER connector	Connector for probe power. ±15V output

2.2.3　R3764CH/66CH
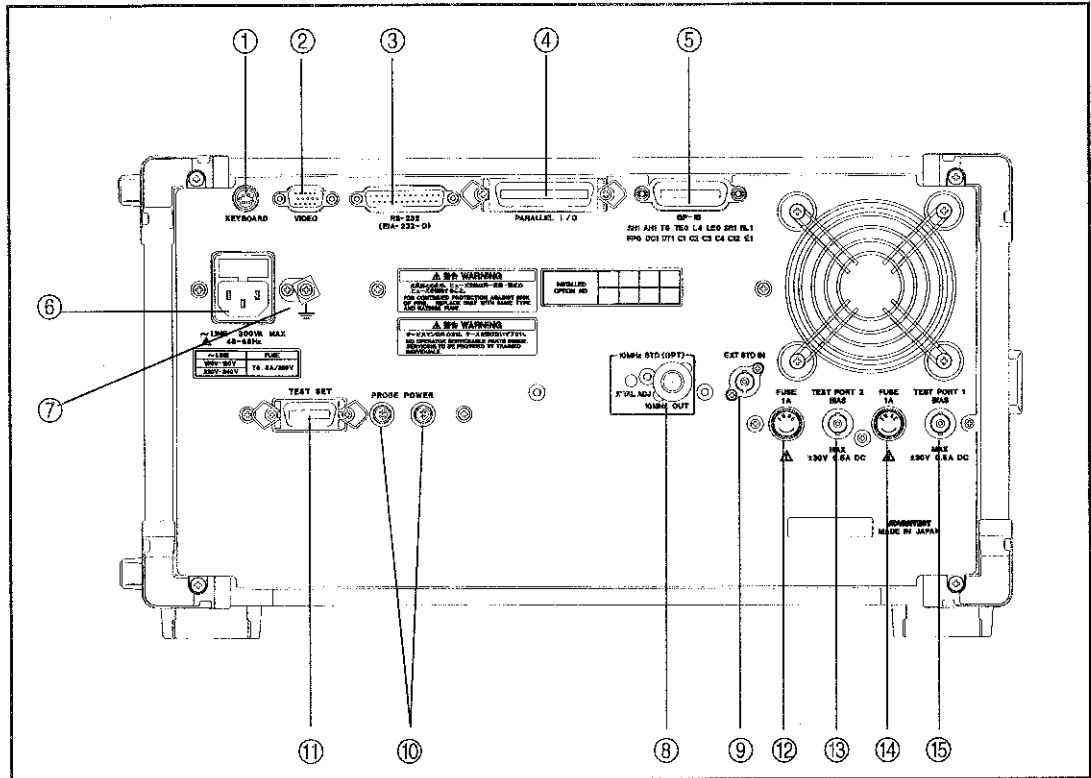
Figure 2-6 Rear Panel Descriptions (R3764CH/66CH)

No.	Name	Description
①	KEYBOARD INPUT connector	Connector to connect PS/2 type (6-pin small size DIN) key board. An external keyboard can be used to input a label name, a saving register name and a BASIC text.
②	VIDEO SIGNAL output	Video signal output correspondence to VGA. (15-pin)
③	SERIAL I/O	Input/output connector conformed to RS-232 standard. (D Sub 25-pin)
④	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) *Use shielded cables for connection (to prevent malfunction by noise).

2.2 Rear Panel Descriptions

No.	Name	Description
⑤	GPIB connector	The GPIB connector is used to remotely control an external peripheral devices and to be remotely controlled by an external controller.
⑥	AC POWER connector	The AC POWER connector has three-pin structure including an earth pin. To remove a power fuse, pull out the upper cover.
⑦	Ground terminal	The ground terminal is used to ground the R3764CH/66CH only when three-pin connector or two-pin adapter for power cable cannot be used.
⑧	Connector for option	Spare connector for option.
⑨	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
⑩	PROBE POWER connector	Connector for probe power ±15V output
⑪	TEST SET connector	Connector for connecting S parameter test-set.
⑫	Fuse holder *	Protective fuse (1A) for bias input to TEST PORT 2.
⑬	TEST PORT 2 BIAS	Connector (MAX. ±30V 0.5A DC) for bias input to TEST PORT 2.
⑭	Fuse holder *	Protective fuse (1A) for bias input to TEST PORT 1.
⑮	TEST PORT 1 BIAS	Connector (MAX. ±30V 0.5A DC) for bias input to TEST PORT 1.

* : Refer to section 1.8 for the replacement of protective fuse.

3 BASIC OPERATION

3.1 Basic Key Operation

This section explains the functions of the panel keys (except the PRESET key) of each mode and how to use these keys.

Basically, the panel keys have four modes: BASIC, LOAD (file load), FILE (file operations) and CONFIG (CONFIG file edit). The BASIC mode is at the base of the other three independent modes (see Figure 3-1). The keys except the PRESET key function differently according to the modes.
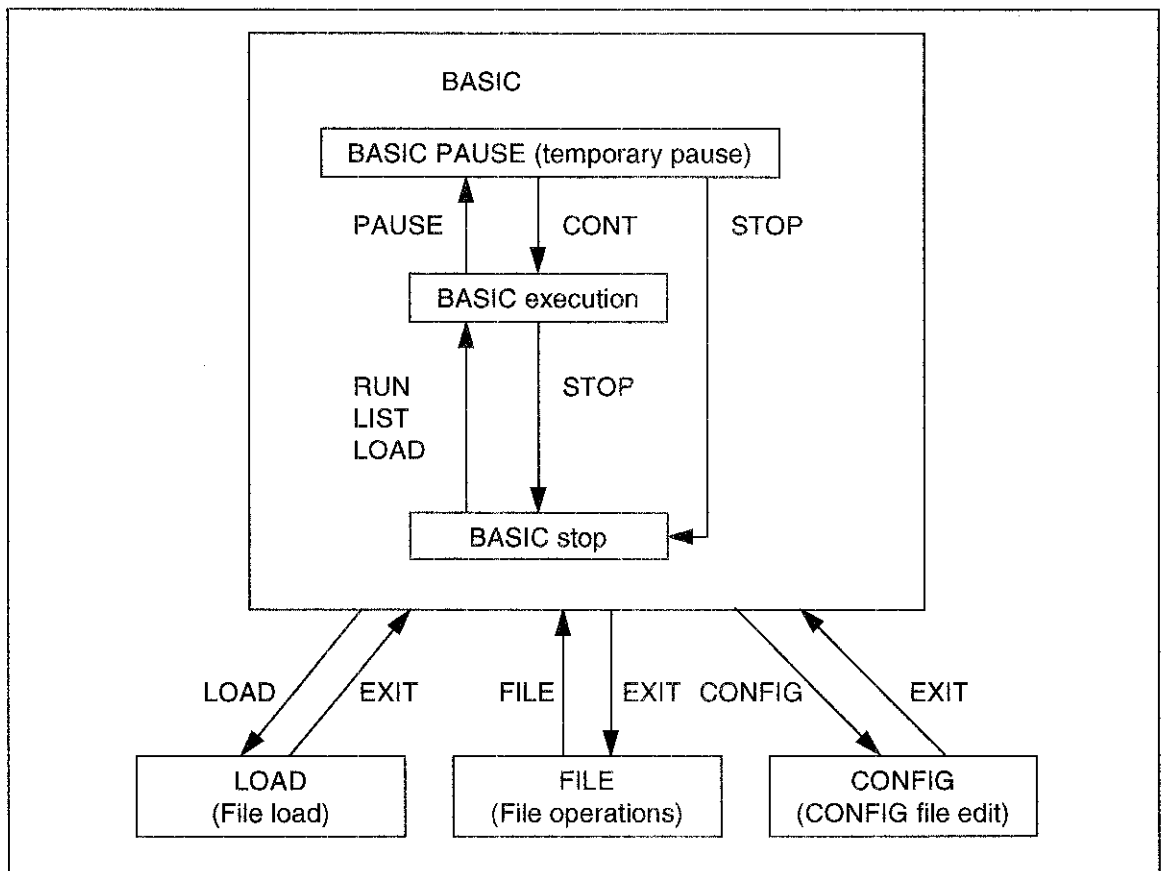
Figure 3-1 Panel Mode Transitions

3.1.1 Key Names and Functions

The keys on the panel except the PRESET key function differently according to the modes. This section gives the key names and outlines their functions. (For the functions in individual modes and operations, see the explanation of mode operations.)
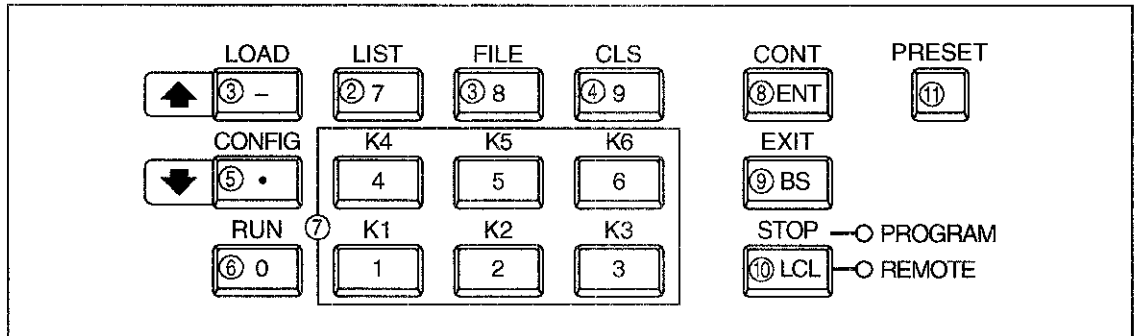
No.	Name	Function
①	LOAD key	Used to select the LOAD mode (selecting the BASIC LOAD file). In the LOAD or FILE (file operations) mode, this key moves the cursor upward. During the execution of a BASIC program, this key functions as a minus (-) key.
②	LIST key	Used to display program list in BASIC. During the execution of a BASIC program, this key functions as a numeric key (7).
③	FILE key	Used to select the FILE (file operations) mode. During the execution of a BASIC program, this key functions as a numeric key (8).
④	CLS key	Clears the screen in the BASIC mode. During the execution of a BASIC program, this key functions as a numeric key (9).
⑤	CONFIG key	Used to select the CONFIG.SYS edit mode. In the LOAD (selecting the BASIC LOAD file) or FILE (file operations) mode, this key moves the cursor downward. During the execution of a BASIC program, this key functions as a period (.) key.
⑥	RUN key	Executes the program loaded in memory. During the execution of a BASIC program, this key function as a numeric key (0).

No.	Name	Function
⑦	K1 to K6 key	In the FILE (file operations) mode, these keys are used as function keys. During the execution of a BASIC program, these keys are used as function keys (K1 to K6) or numeric keys (1 to 6).
⑧	CONT·ENT key	Functions as an ENTER key to execute or determine various functions. In the BASIC PAUSE mode (temporary program stop), this key functions as the CONT key to continue the program.
⑨	EXIT·BS key	Functions as the EXIT key to cancel the function. During the execution of a BASIC program, this key functions as the BS (Back space) key.
⑩	STOP/LOCAL key	When the R3764/66H series is in the Remote On mode, the REMOTE LED is on. In this case, the STOP/LOCAL key functions as the LOCAL key. It allows the user to control from the front panel. When the R3764/66H series is under control of an external computer (Remote On mode), all keys except the LOCAL key are unavailable. To allow the user to access to the R3764/66H series from the keys on the panel, the R3764/66H series must be in the Remote Off mode. In the Remote Off mode, the REMOTE LED is off. During the execution of a BASIC program, the PROGRAM LED is on. In this case, the STOP/LOCAL key functions as the STOP key which stops the program currently running. When the program stops, the PROGRAM LED goes off. * While the REMOTE LED is on, the STOP/LOCAL key functions as the LOCAL key even if the PROGRAM LED is on.
⑪	PRESET key	Initializes the states of the R3764/66H series. For details of initialization, see section A.1 "Initialization".

4 FUNCTION DESCRIPTION

4.1 Description of the Keys for Each mode

4.1.1 BASIC Mode

When the power is turned on, the R3764/66H series is initialized and enters the BASIC mode. The BASIC mode is further divided into three modes: BASIC stop, BASIC execution and BASIC pause modes. The keys on the panel have different functions according to the modes.

(1) BASIC stop

In this mode, BASIC is doing nothing. The names and functions of the keys available in this mode are described below.
Figure 4-1 shows the key arrangement in the BASIC stop mode. (Only the keys surrounded by the dotted lines can be used.)
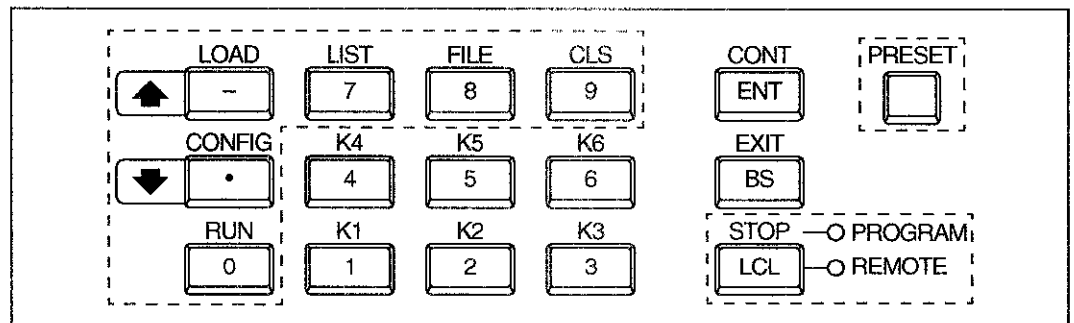
Figure 4-1 Key Arrangement in BASIC (BASIC stop) Mode

Name	Function
LOAD key	Places the R3764/66H series in the LOAD (file load) mode and displays file names, etc. (See sub-section 4.1.2 "LOAD Mode".)
LIST key	Lists the program loaded in memory.
FILE key	Places the R3764/66H series in the FILE (file operations) mode and displays file names, etc. (See sub-section 4.1.3 "FILE Mode".)
CLS key	Clears the screen.
CONFIG key	Places the R3764/66H series in the CONFIG (CONFIG file edit) mode and displays the system set values. (See sub-section 4.1.4 "CONFIG Mode".)

4.1 Description of the Keys for Each mode

Name	Function
RUN key	Executes the program loaded in memory. The R3764/66H series enters the BASIC execution mode and the PROGRAM LED goes on. (For program loading from the panel, see sub-section 4.1.2 "LOAD Mode".)
STOP key	Stops the current operation (list display, etc.) and the PRO-GRAM LED goes off. If the PROGRAM LED is on but the REMOTE LED is still on, this key functions as the LOCAL key.

(2)   BASIC execution

A BASIC program is being executed in this mode. The names and functions of the keys available in this mode are described below.
Figure 4-2 shows the key arrangement in the BASIC execution mode.
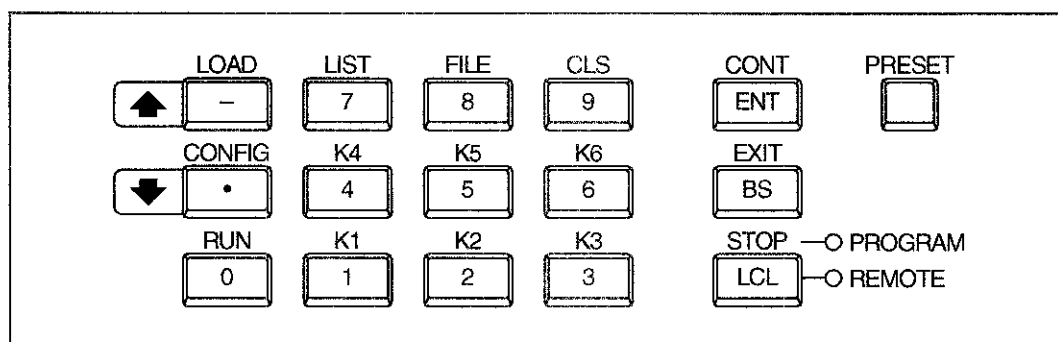
Figure 4-2 Key Arrangement in BASIC (BASIC execution) Mode

Name	Function
Ten key, ENT key, BS key	Used to input numeric or key values for BASIC INPUT instructions, etc.
STOP key	Causes the program currently running to be stopped and the PROGRAM LED to go off. If the PROGRAM LED is on but the REMOTE LED is still on, this key functions as the LOCAL key.

(3)   BASIC PAUSE (pause)

Execution of a BASIC program is temporarily stopped (paused) in this mode. The names
and functions of the keys available in this mode are described below.
Figure 4-3 shows the key arrangements in the BASIC PAUSE mode. (Only the keys sur-
rounded by the dotted line can be used.)
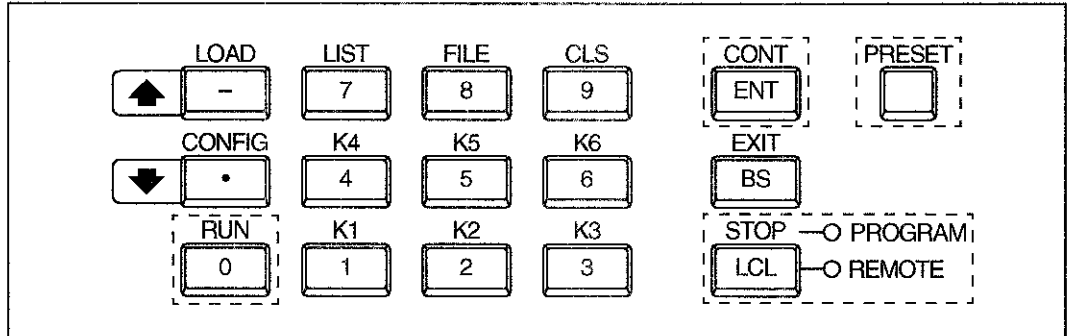
Figure 4-3 Key Arrangement in BASIC PAUSE Mode

Name	Function
RUN key	Executes the paused program from the beginning. The R3764/66H series enters the BASIC execution mode.
CONT key	Restarts executing the paused program from the current paused position. The R3764/66H series enters the BASIC execution mode.
STOP key	Causes the paused program to be terminated and the PROGRAM LED to go off. If the PROGRAM LED is on, but the REMOTE LED is still on, this key functions as the LOCAL key.

4.1.2 LOAD Mode

The LOAD mode allows displaying the files in the drives (drives A to D) and loading BASIC files. Pressing the LOAD key in the BASIC stop mode causes a screen like that shown in Figure 4-4 to appear.


```
①     A : /                              [ F D D ]         ②

③     FILE1.BAS      RW   FILE2.BAS      RW
      FILE3.BAS      RW   FILE4.BAS      RW
      FILE5.BAS      RW   FILE6.BAS      RW
④     FILE7.BAS      RW   FILE8.BAS      RW
      FILE9.BAS      RW   FILE10.BAS     RW        ⑥
      FILE11.SYS     --   FILE12.DOC     R-

      41  files           3071bytes  free          ⑤
```

①: Path name
     (current drive + directory name)
②: Drive type of current drive
③: File name
④: File attribute
⑤: Drive information
⑥: Scroll bar
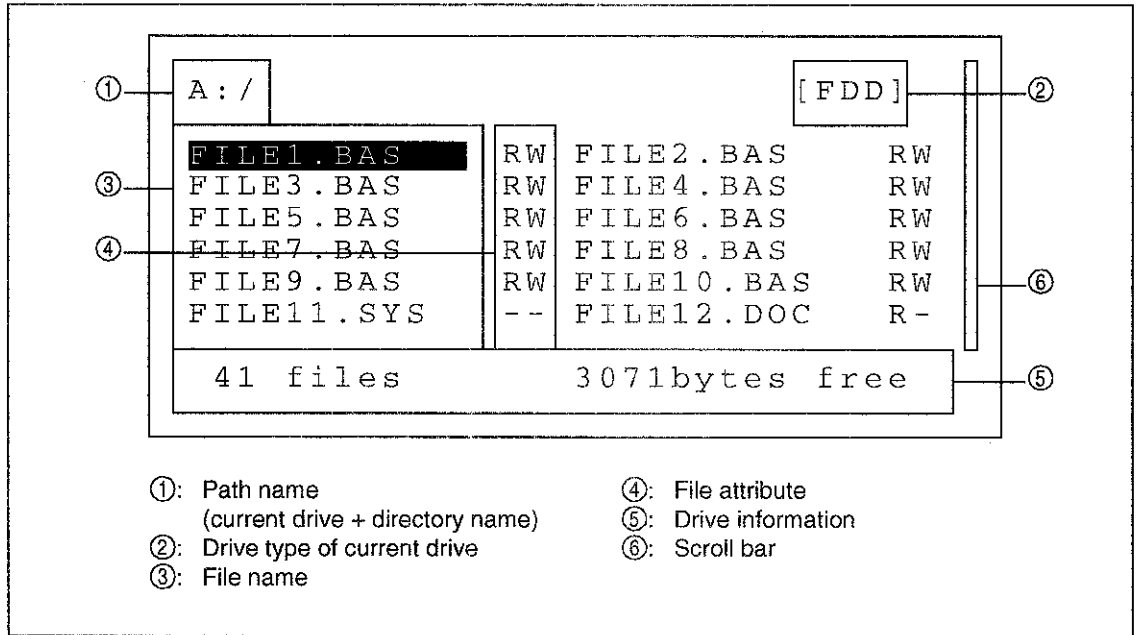
Figure 4-4 LOAD Mode Screen

The first line shows the current path name (①) and the current drive type (②). The path name means the drive + directory name, indicating which directory of which drive is currently used as the working directory.

The second through seventh lines show the file names (③) and attributes (④) in two columns (one screen shows the data for 12 files). The cursor is indicated by reversing the display of a file name. The file at the cursor position is currently being processed.

The eighth line shows the number of files and free area (⑤) in the current drive.

On the right end is a scroll bar (⑥). It indicates the ratio of the displayed files to all of the files included in the current directory.

- Drive type:
  [FDD]; Floppy Disk Drive
  [RAM]; RAM drive
  [ROM]; ROM drive

- File attributes:
  RW;   Read/Write file (allowing both read and write)
  R-;   Read Only file
  --;   System file (inhibiting both read and write)
  <D>; Directory (subdirectory)

Figure 4-5 shows the keys available in this mode. (Only the keys surrounded by the dotted line can be used.)
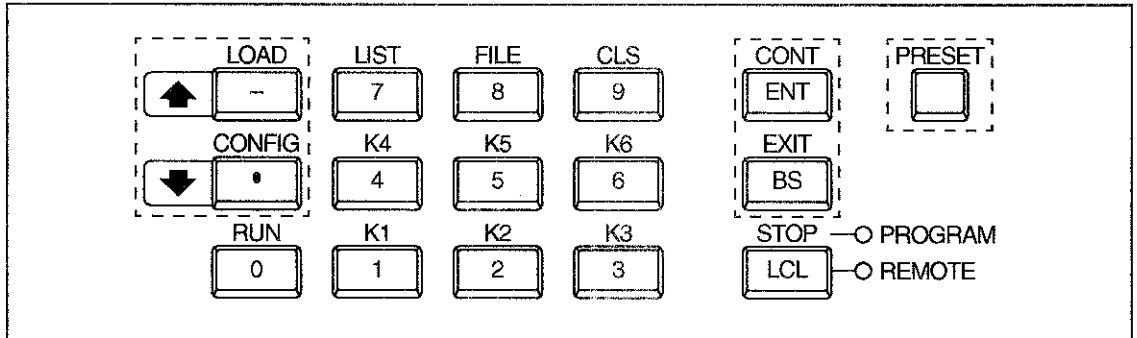
Figure 4-5 Key Arrangement in LOAD Mode

Name	Function
↑, ↓ key	Used to move the cursor.
ENT key	If the file indicated by the cursor is a subdirectory, makes subdirectory the working directory and displays the files in the directory. If the file indicated by the cursor is a text file, pressing this key loads this file to memory and places the R3764/66H series in the BASIC mode. (Even if the text file is not a BASIC file, the R3764/66H series enters the BASIC mode instead of the LOAD mode.)
EXIT key	If the current working directory is the root directory, the R3764/66H series exits the LOAD mode and returns to the BASIC mode. If the working directory is a subdirectory, this key moves the working directory to the previous parent directory and displays the files in the directory.

Note : *The LOAD mode does not allow to change the drive. The drive can be changed only in the FILE mode. To change the drive in the LOAD mode, once enter the FILE mode, change the directory and then return to the LOAD mode.*

4.1.3 FILE Mode

This mode is used for file and drive operations such as file deletion and file copy between drives. Pressing the FILE key in the BASIC stop mode causes a screen like that shown in Figure 4-6 to appear.

① : Path name
(current drive + directory name)
② : Drive type of current drive
③ : File name
④ : File attributes
⑤ : File size (bytes)
⑥ : File creation date (year-month-day)
⑦ : Function key list
⑧ : Scroll bar
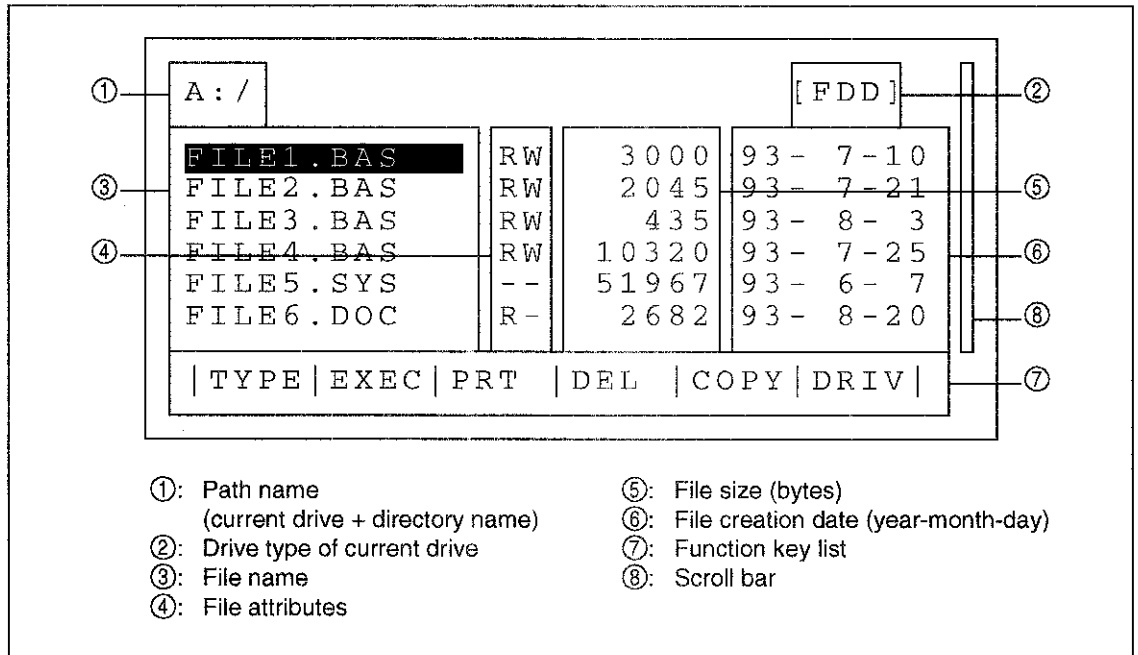
Figure 4-6 FILE Mode Screen

The first line shows the current path name (①) and the current drive type (②). The path name means the drive + directory name, indicating which directory of which drive is currently used as the working directory.

The second through seventh lines show the file name (③), attributes (④), file size in bytes (⑤), and file creation date (⑥ : year-month-day) in one column (one screen shows the data for six files). The cursor is indicated by reverse display of a file name. The file at the cursor position is currently being processed.

The eighth line shows the functions available in the FILE mode which are allocated to function keys K1 to K6 (⑦).

On the right end is a scroll bar (⑧). It indicates the ratio of the displayed files to all of the files included in the current directory.

- Drive type:
  [FDD]; Floppy Disk Drive
  [RAM]; RAM drive
  [ROM]; ROM drive

- File attributes:
  RW; Read/Write file (allowing both read and write)
  R-; Read Only file
  --; System file (inhibiting both read and write)
  <D>; Directory (subdirectory)

Figure 4-7 shows the keys available in this mode. (Only the keys surrounded by the dotted lines can be used.)

Figure 4-7 Key Arrangement in FILE Mode

Name	Function
↑, ↓ key	Used to move the cursor. In the FILE mode, pressing the ↑ key moves the cursor upward and pressing the ↓ key moves the cursor downward.
ENT key	If the file indicated by the cursor is a subdirectory, this key makes subdirectory the working directory and displays the files in the directory.
EXIT key	If the current working directory is the root directory, the R3764/66H series exits the FILE mode and returns to the BASIC mode. If the working directory is a subdirectory, this key moves the working directory to the previous parent directory and displays the files in the directory.
TYPE (K1) key	If the file indicated by the cursor is a readable text file, this key displays the file contents. (For details, see (1) below.)
EXEC (K2) key	If the file indicated by the cursor is a text file, it is assumed to be a BASIC file and the BASIC temporarily executes the file. The R3764/66H series exits the FILE mode and enters the BASIC mode regardless of whether the files have been loaded or the execution has succeeded.
PRT (K3) key	If the file indicated by the cursor is a readable text file, this key outputs the file contents to the printer connected to the RS-232 or GPIB connector. (For details, see (3) below.)
DEL (K4) key	If the file indicated by the cursor is a writable file (the file attribute is "RW"), this key deletes the file. (For details, see (4) below.)
COPY (K5) key	If the file indicated by the cursor is a readable file, this key copies the file between drives. (For details, see (5) below.)

Name	Function
DRIV (K6) key	This key is used to change the current drive or to initialize the floppy disk. (For details, see (6) below.)

(1) TYPE (file contents display) function

The TYPE key displays the file contents on the screen.
Pressing the TYPE (K1) key in the FILE mode causes a screen like that shown in Figure 4-8 to appear if the file indicated by the cursor is a readable text file.

```
①——  A:/TEST1.BAS

      10  !
②——   20  !SAMPLE PROGRAM
      30  !
      40  PRINT  "TEST PROGRAM NO.1"
      50  INPUT  "CENTER FREQUENCY(MHz)?
      60  INPUT  "SPAN FREQUENCY(kHz)?",

③——  |  <- | -> |      |      |      |      |

①:  File name                              ③:  Function key list
    (current drive + directory name + file name)
②:  Program list
```
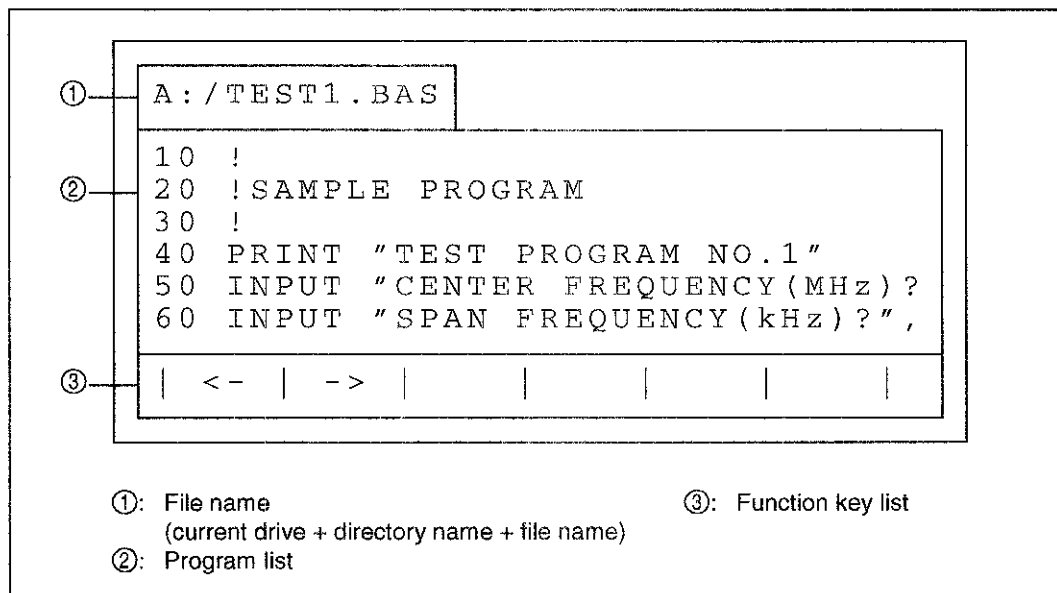
Figure 4-8 TYPE (file contents display) Screen

The first line shows the current path name ((①)). The path name means the drive + directory name + current file name.
The second through seventh lines show the file contents ((②)). One line can display a maximum of 32 characters. If it contains more than 32 characters, the exceeding characters can be displayed by shifting the screen horizontally with function keys.
The eighth line shows the functions available in TYPE mode (file contents display) ((③)).
(Function keys shown as blank are allocated no function.)

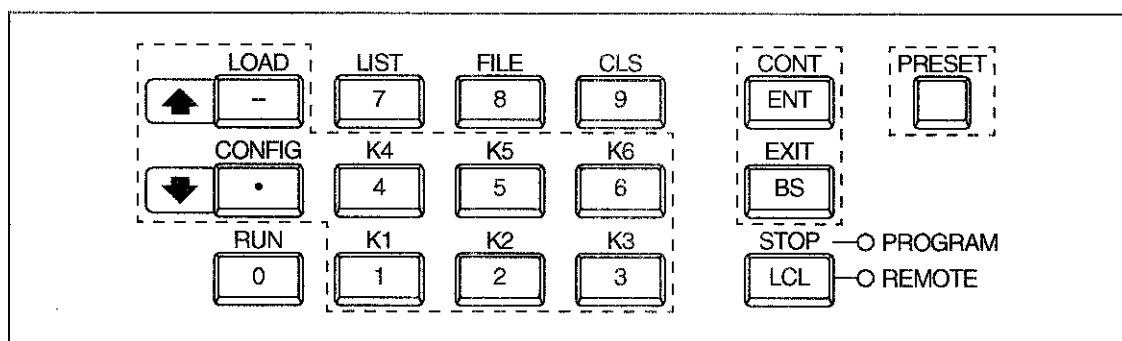Figure 4-9 shows the keys available in this mode. (Only the keys surrounded by the dotted lines can be used.)
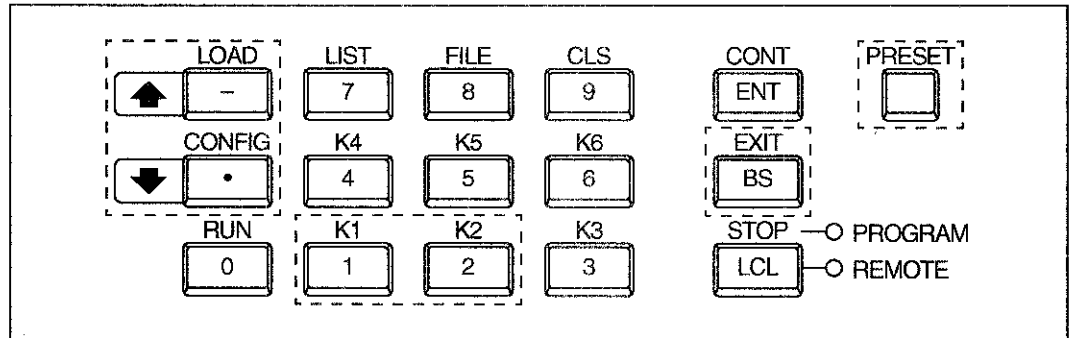
Figure 4-9 Key Arrangement in TYPE (file contents display) Mode

Name	Function
↑, ↓ key	Used to scroll the list display of file contents. Pressing the ↑ key scrolls the display upward and pressing the ↓ key scrolls the display downward.
<- (K1), -> (K2) key	If more than 32 characters are contained in one line, these keys can be used to display the exceeding data. One line can contain a maximum of 256 characters. Characters after the 256th character, if any, are not displayed (that is, ignored).
EXIT key	The R3764/66H series exits the TYPE (file display) mode and returns to the FILE mode.

(2) EXEC (BASIC file execution) function

When the file indicated by the cursor is a text file, the EXEC key temporarily executes that file. When the program executed by EXEC completes or stops, it is removed from memory.

(3)   PRT (file contents print) function

The PRT function outputs the contents of a text file to a printer.
If the file indicated by the cursor is a readable text file, pressing the PRT (K3) key in the
FILE mode causes a screen like that shown in Figure 4-10 to appear.

①:	Path name	⑤:	File size (bytes)
	(current drive + directory name)	⑥:	File creation date (year-month-day)
②:	Drive type of current drive	⑦:	Function key list
③:	File name	⑧:	Scroll bar
④:	File attribute		
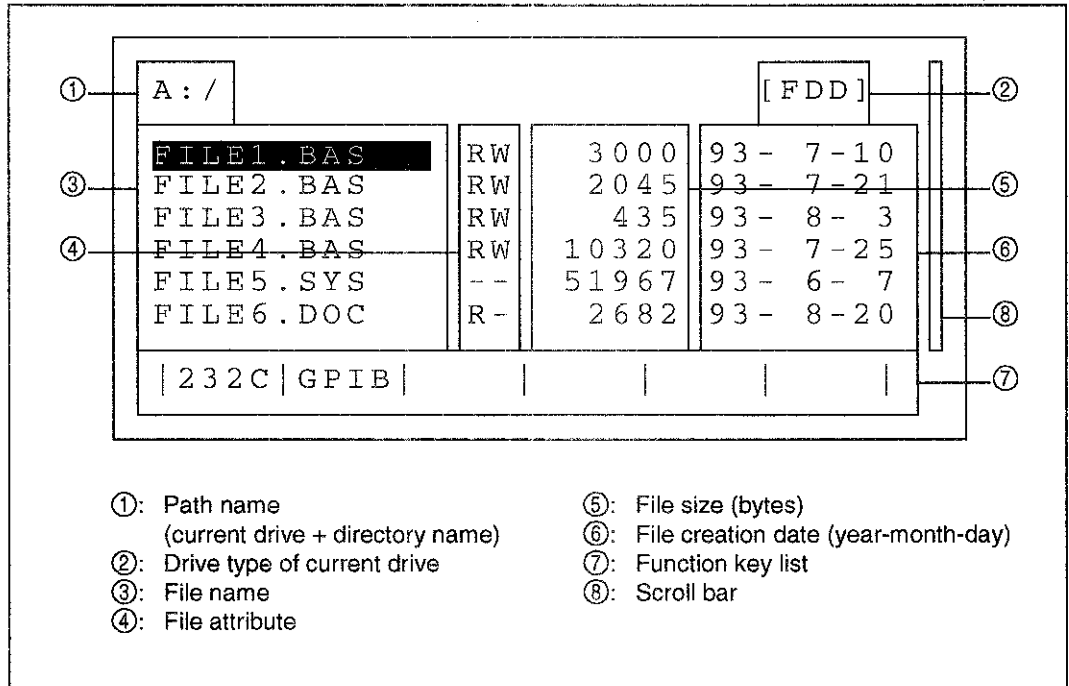
Figure 4-10 PRT (file contents print) Screen

The first through seventh lines are the same as those for FILE mode screen (see Figure 4-6). The function keys displayed in the eighth line are those for a printer. (Function keys shown as blank are allocated no functions.)

Figure 4-11 shows the keys available in this mode. (Only the keys surrounded by the dotted line can be used.)

Figure 4-11 Key Arrangements for PRT (file contents print)

Name	Function
232 (K1) key	Outputs the contents of the file indicated by the cursor through RS-232. To use RS-232, the following settings are necessary: 1. Baud rate 2. Parity 3. Character length 4. Stop bits These settings must be the same as those of the output destination. They may be set in the CONFIG mode. (For details, see sub-section 4.1.4 "CONFIG Mode".)
GPIB (K2) key	Outputs the contents of the file indicated by the cursor through GPIB. Before using GPIB, set CONTROLLER = ON in the CONFIG mode and set the printer address. (For details, see sub-section 4.1.4 "CONFIG Mode".) To stop the output through GPIB, press the PRESET key.

(4)   DEL (file deletion) function

If the file indicated by the cursor is a writable file, pressing the DEL (K4) key in the FILE mode causes a message like that shown in Figure 4-12 to appear on the screen.

Figure 4-12 DEL (file deletion) Screen

Figure 4-13 shows the keys available in this mode. (Only the keys surrounded by the dotted lines can be used.)
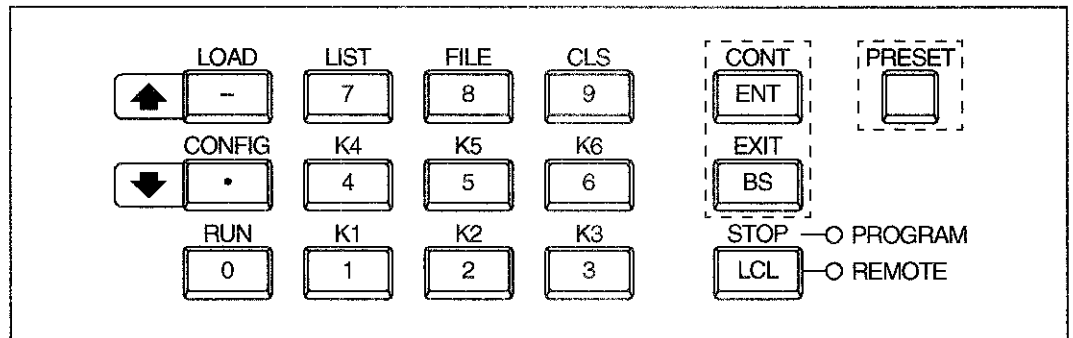
Figure 4-13 Key Arrangement for DEL (file deletion)

Name	Function
ENT key	Deletes the file indicated by the cursor.
EXIT key	Returns to the FILE mode without deleting the file.

(5)   COPY (file copy between drives) function

The COPY key is used to copy files between drives. That is, it copies the specified file to the root directory in the copy destination drive.
If the file indicated by the cursor is a readable file, pressing the COPY (K5) key in the FILE mode causes a screen like that shown in Figure 4-14 to appear.

①:	Path name	⑤:	File size (bytes)
	(current drive + directory name)	⑥:	File creation date (year-month-day)
②:	Drive type of current drive	⑦:	Function key list
③:	File name	⑧:	Scroll bar
④:	File attribute		
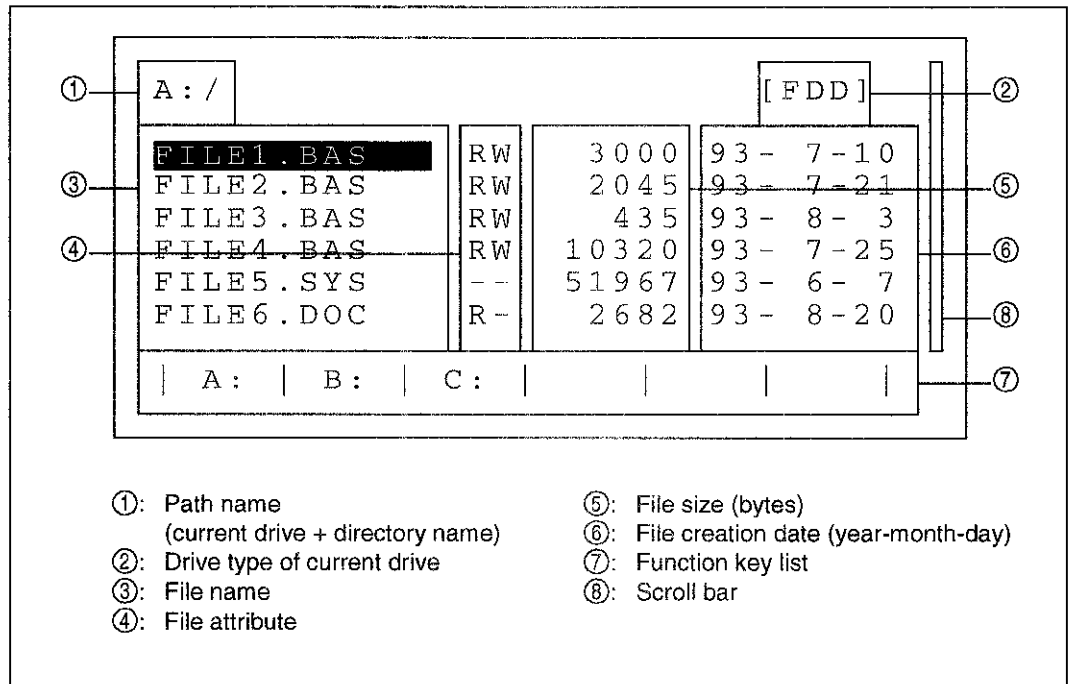
Figure 4-14 COPY (file copy between drives) Screen

The first through seventh lines are the same as those for FILE mode screen (see Figure 4-6). The function keys displayed in the eighth line are those for COPY. (Function keys shown as blank are allocated no functions.)

Figure 4-15 shows the keys available in this mode. (Only the keys surrounded by the dotted line can be used.)
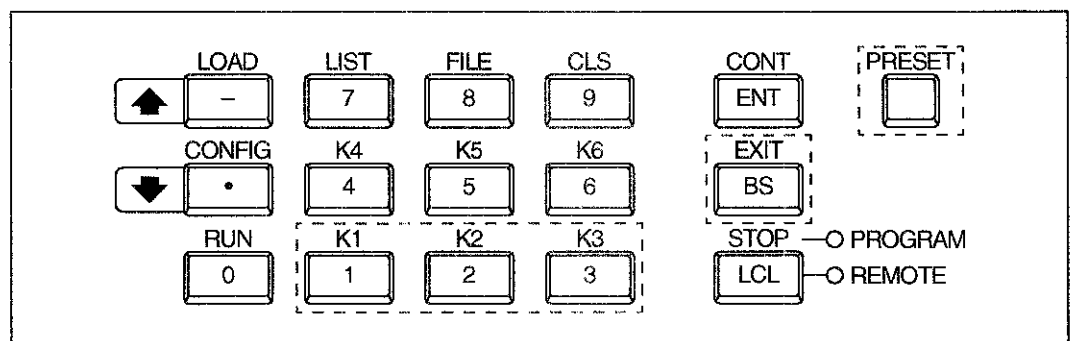
Figure 4-15 Key Arrangement in COPY (file copy between drives) Mode

4.1 Description of the Each Mode Key

Name	Function
A: (K1), B: (K2), C: (K3) key	These keys specify the copy destination drive. Files cannot be copied within the same drive. Directories cannot be copied.
EXIT key	Stops copying and returns to the FILE mode.

Specifying the drive causes a message like that shown in Figure 4-16 to appear.

```
Copy file
①──A:/TEST1.BAS
②──-> B:

Press Yes<ENT> or No<EXIT>?




```

①: Current file (COPY source file)
②: Copy destination drive (drive specified by the function key)
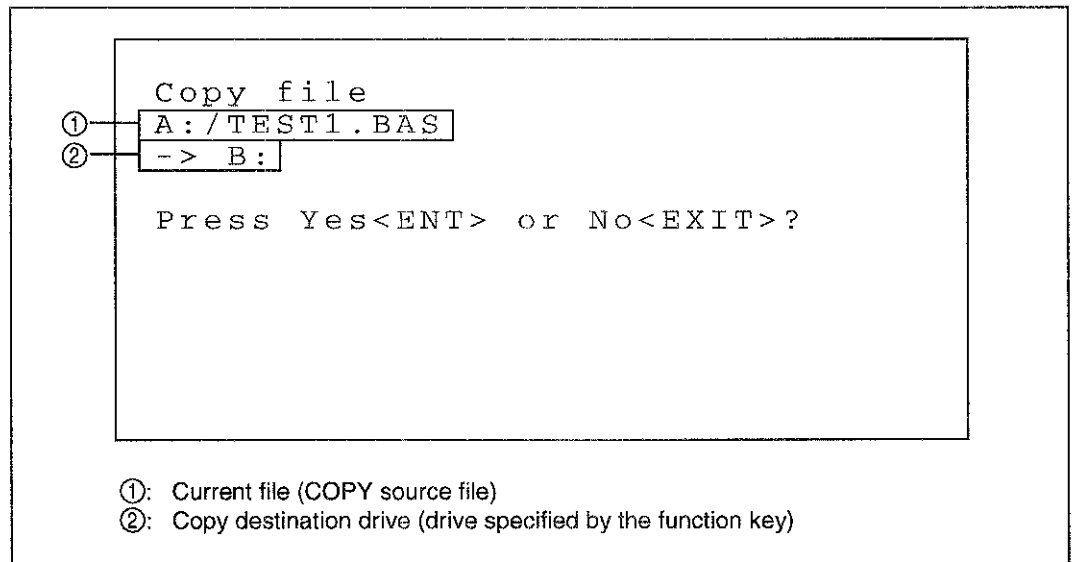
Figure 4-16 COPY (file copy between drives) Check Screen

In this screen, check the source file (①) and copy destination drive (②). The source file is the file indicated by the cursor in the FILE mode.

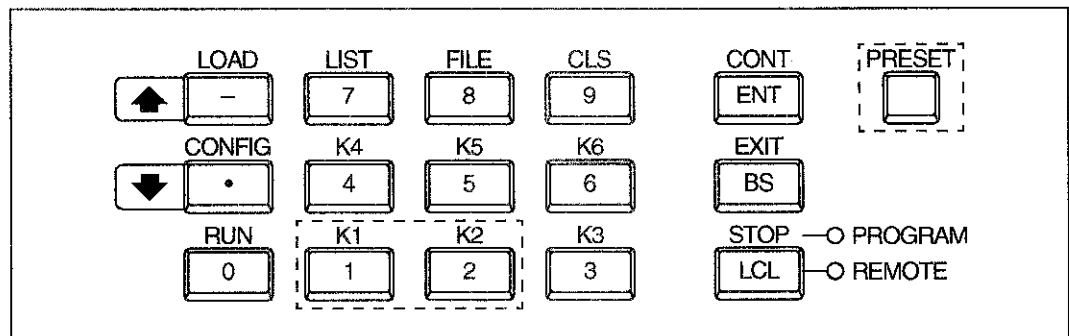Figure 4-17 shows the keys available in this mode. (Only the keys surrounded by the dotted line can be used.)
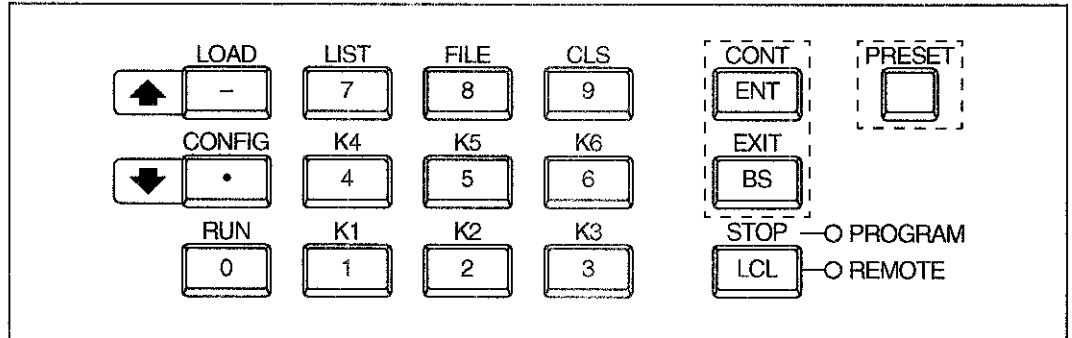
Figure 4-17 Key Arrangement for COPY (file copy between drives)

Name	Function
ENT key	Executes copy and then returns to the FILE mode.
EXIT key	Stops copying and returns to the FILE mode.

4.1 Description of the Keys for Each mode

(6)   DRIV (drive operation) function

The DRIV key is used for drive operations such as changing the current drive or initializing the floppy disk.
Pressing the DRIV (K6) key in the FILE mode causes a screen like that shown in Figure 4-18 to appear.

①: Path name
     (current drive + directory name)
②: Drive type of current drive
③: File name
④: File attribute

⑤: File size (bytes)
⑥: File creation date (year-month-day)
⑦: Function key list
⑧: Scroll bar
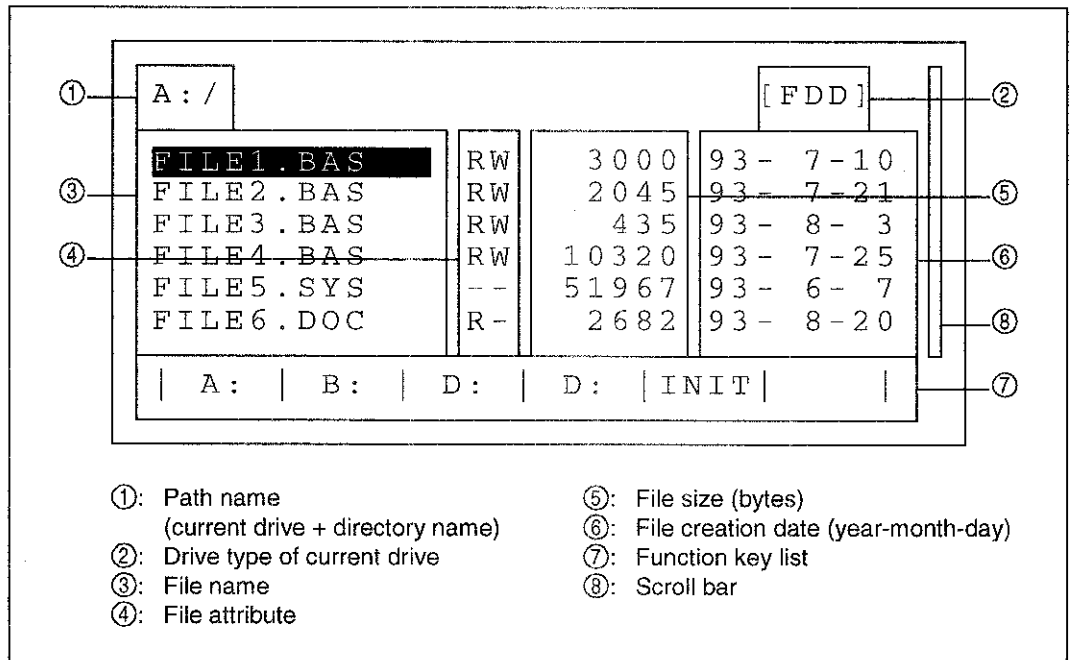
Figure 4-18 DRIV (drive operation) Screen

The first through seventh lines are the same as those for FILE mode screen (see Figure 4-6). The function keys displayed in the eighth line are those for DRIV.
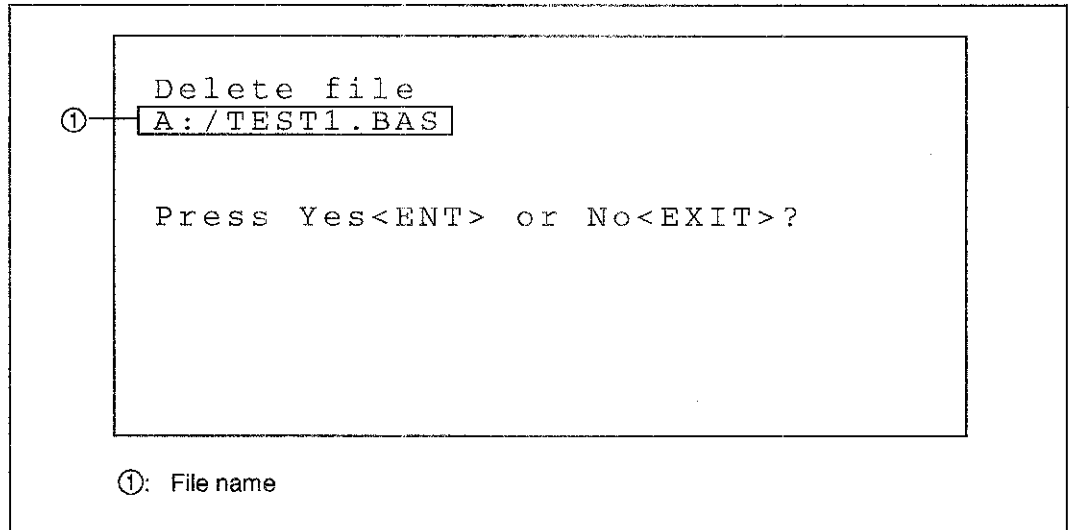
Figure 4-19 shows the keys available in this mode. (Only the keys surrounded by the dotted lines can be used.)
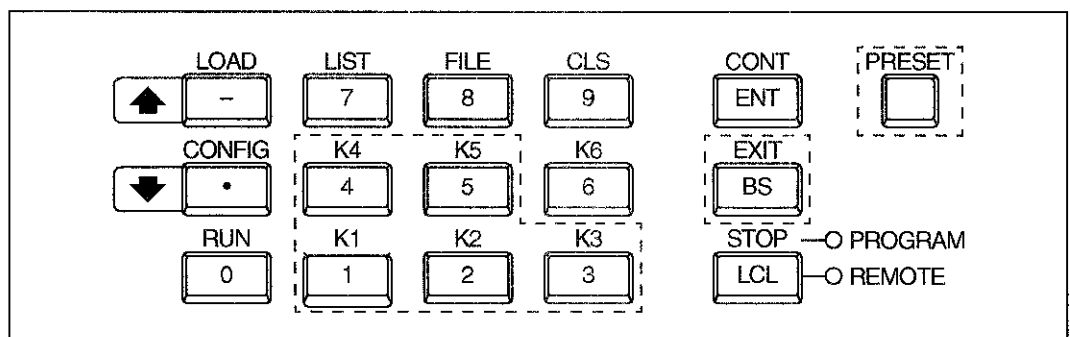
Figure 4-19 Key Arrangement for DRIV (drive operation)

Name	Function
A: (K1), B: (K2), C: (K3), D: (K4) key	These keys are used to change the current drive. After changing the drive, the R3764/66H series returns to the FILE mode. (This is the only way to change the drive from the panel.)
INIT key	Initializes the floppy disk. (For details, see (7) below.)
EXIT key	Stops the DRIV operation and returns to the FILE mode.

(7)   INIT (floppy disk initialization) function

The INIT key is used to initialize the floppy disk (drive A).
Pressing the INIT (K5) key from DRIV (drive operation) causes a message like that shown in Figure 4-20 to appear.

```
Initialize  Floppy  Disk

Initialize  Type  ->?




  |IBM  |NEC  |IBM  |IBM  |      |      |
  |720K |1.2M |1.2M |1.4M |      |      |
```
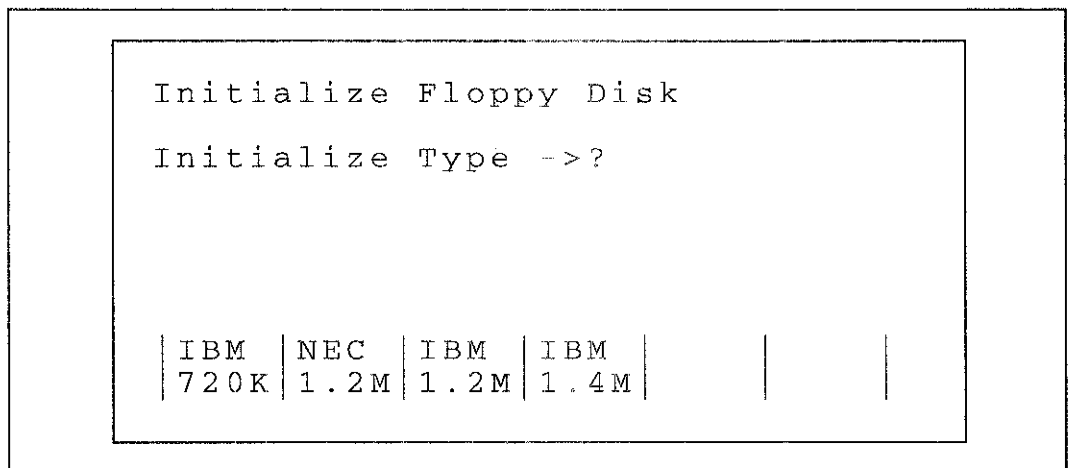
Figure 4-20 INIT (floppy disk initialization) Selection Screen

First, select the initialization mode (format type) of the floppy disk.

Figure 4-21 shows the keys available in this mode. (Only the keys surrounded by the dotted line can be used.)
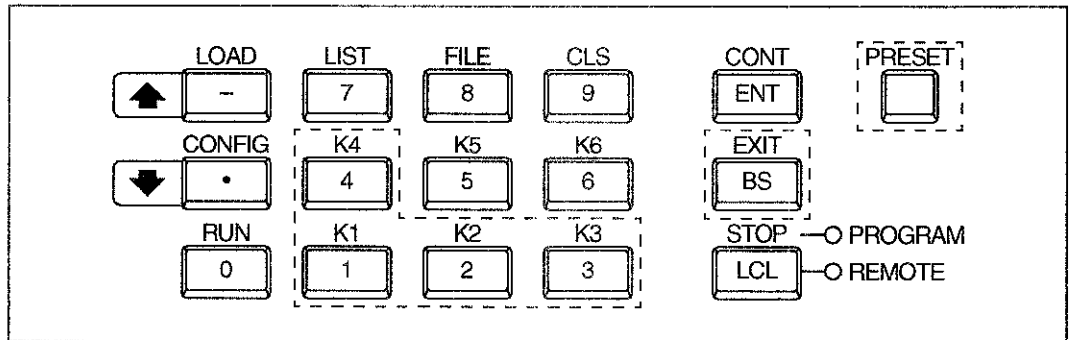
**Figure 4-21 Key Arrangement for Selecting Initialization Size**

Name	Function
IBM 720K (K1) key	Initializes a 2DD floppy disk in the 720K-byte 9-sector/track format (same as the IBM 2DD floppy disk format).
NEC 1.2M (K2) key	Initializes a 2HD floppy disk in the 1.2M-byte 8-sector/track format (same as the NEC PC-9801 Series 2HD floppy disk format).
IBM 1.2M (K3) key	Initializes a 2HD floppy disk in the 1.2M-byte 15-sector/track format.
IBM 1.4M (K4) key	Initializes a 2HD floppy disk in the 1.4M-byte 15-sector/track format.
EXIT key	Returns to the FILE mode without executing initialization.

When the 720K-byte, 1.2M-byte or 1.4M-byte format is selected, the screen displays a message like that shown in Figure 4-22.
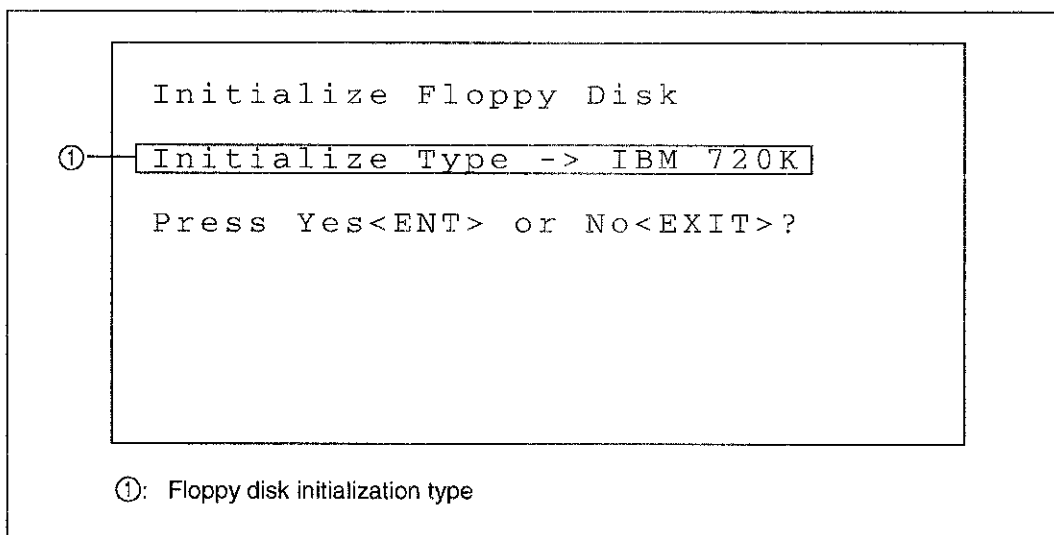
Figure 4-22 INIT (floppy disk initialization) Check Screen

In this screen, check the floppy disk initialization size (①).

Figure 4-23 shows the keys available in this mode. (Only the keys surrounded by the dotted line can be used.)
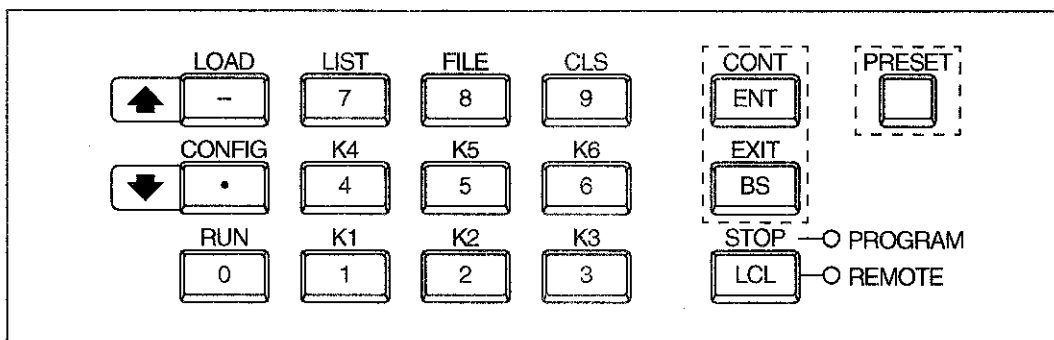
Figure 4-23 Key Arrangement for Checking Initialization

Name	Function
ENT key	Executes initialization. After that, the R3764/66H series returns to the FILE mode.
EXIT key	Returns to the FILE mode without executing initialization.

4.1.4 CONFIG Mode

This mode allows the GPIB and serial settings. Pressing the CONFIG key while the BASIC is being stopped causes a screen like that shown in Figure 4-24 to appear.


```
①──┌ DATE         = │ 10/01/93
     │ TIME         = │ 10:00:00
     │ ADDRESS      = │ 11
     │ CONTROLLER   = │ OFF
     │ PRINTER      = │ 12
②──┤ PLOTTER       = │ 13
     │ BAUD         = │ 9600

③── ten key mode.
```

①: Set items
②: Current set values
③: Input method
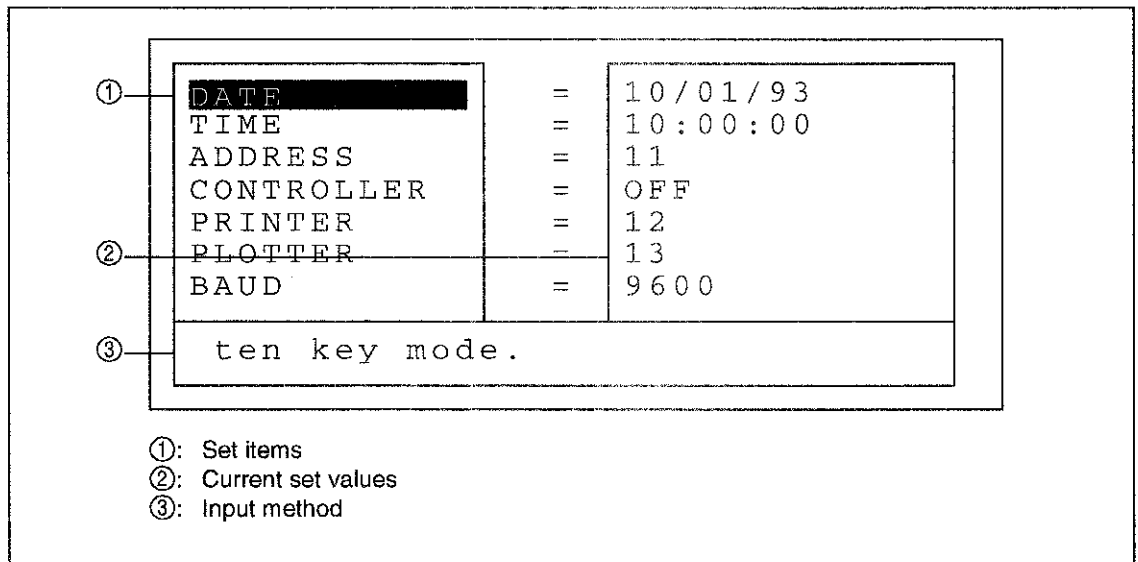
Figure 4-24 CONFIG Mode Screen (for ten-key input)

```
     PRINTER        = 12
     PLOTTER        = 13
     BAUD           = 9600

    |2400|4800|9600|19200|      |      |
       ↓    ↓    ↓    ↓    ↓     ↓
       K1   K2   K3   K4   K5    K6
```
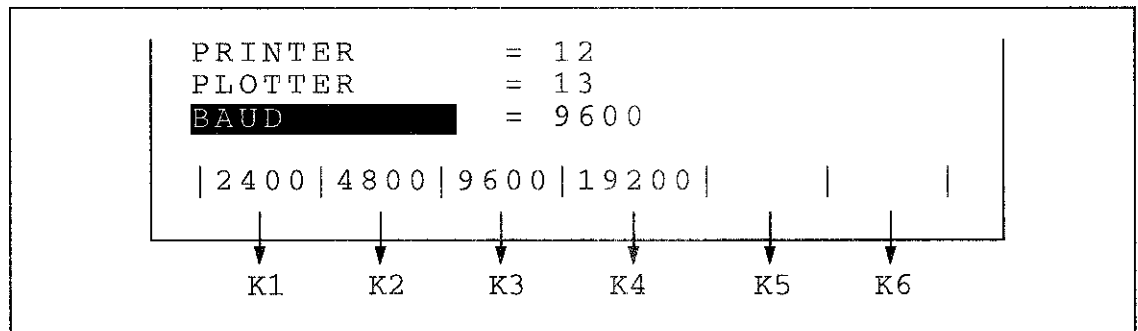
Figure 4-25 CONFIG Mode Screen (for function key input)

The first through seventh lines show the set items (① in Figure 4-24) and the current set values (② in Figure 4-24). The current item is indicated by the cursor.

The eighth line shows the input method (③ in Figure 4-24). When the method is shown as "ten key mode.", input numeric values with the ten keys. For other methods, use function keys K1 to K6 for input (see Figure 4-25). The function keys are K1 through K6 from the left most one. The numeric values shown correspond to these function keys. Select the set values from these numeric values. Function keys shown as blank are unavailable. (In Figure 4-25, the K5 and K6 keys are unavailable.)

Figure 4-26 shows the keys available in this mode. (Only the keys surrounded by the dotted line can be used.)
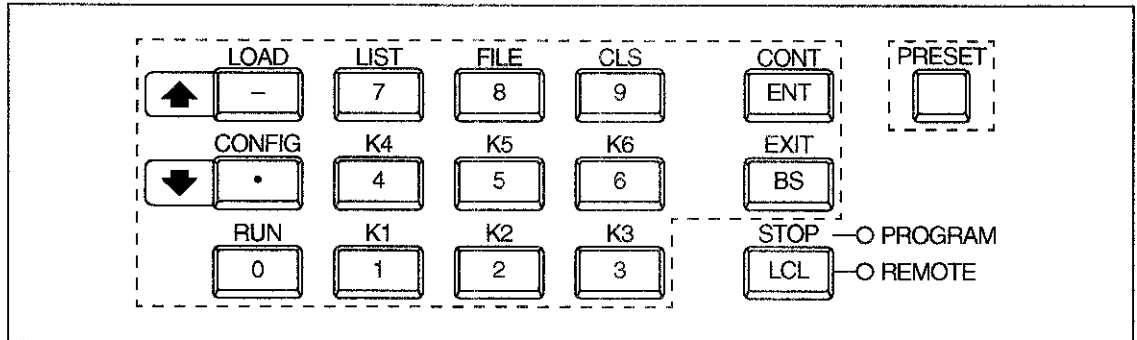
Figure 4-26 Key Arrangement in CONFIG Mode

Name	Function
↑, ↓ key	Used to move the cursor upward or downward. Pressing the ↑ key moves the cursor upward and pressing the ↓ key moves the cursor downward. While inputting values (a cursor appearing at the end of input data), pressing one of these keys stops the input and moves the cursor. The data currently being input is discarded.
ENT key	Used to determine or save the set value. While inputting a set value (a cursor appearing at the end of input data), pressing the ENT key determines the set value. If the set value is correct, the R3764/66H series changes its set value and completes the set operation. If the set value is incorrect, the R3764/66H series prompts re-input. When not inputting a set value (no cursor indicating data input at the end of the current set value), pressing the ENT key causes the set value to be saved. A file is generated in C:/CONFIG.BAT. If the file already exists, it is overwritten. If the file contents are valid, the saved set values are used for the next start-up. Before saving to the file, a screen like that shown in Figure 4-27 appears.
BS key	Available as the BS (Back space) key while inputting set values with the ten keys. While inputting with function keys, the BS key is unavailable. When not inputting set values, pressing the BS key causes to return to the BASIC screen without saving the set values in the file.
Ten key	Used to input numeric values for set items.
Function key (K1 to K6)	When the set values are specific values, use function keys instead of ten keys.

Before set values saving to the file, a screen like that shown in Figure 4-27 appears.

```
Save file.
C:/CONFIG.BAT
Press Yes<ENT> or No<EXIT> key.
```
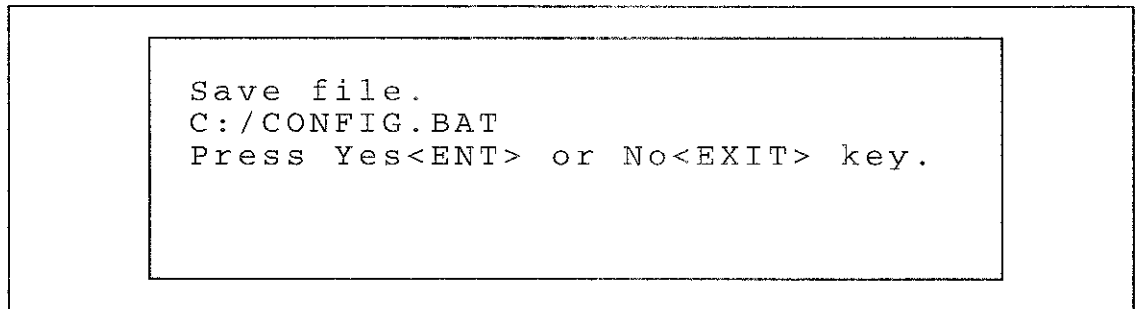
Figure 4-27 Save Check Screen in CONFIG Mode

In the save check screen in CONFIG mode, check whether to execute saving. Press the ENT key to execute saving and the BS (EXIT) key not to execute saving.

<CONFIG mode set items>

In the CONFIG mode, the following items can be set:

Note : *(T) of the item names indicates to use ten keys for input and (F) indicates to use function keys (K1 to K6).*

* DATE(T)

    Set the date by inputting data as month-day-year. Determine the input with the ENT key for each data.
    Example: Set the date of October 1, 1993.

    [1] → [0] → [ENT] → [0] → [1] → [ENT] → [1] → [9] → [9] → [3] → [ENT]

    (When the month or day value consists of one digit, "0" may be omitted.)
    The allowable ranges are: 1 to 12 for the month, 1 to 31 for the day and 1991 to 2030 for the year.

* TIME(T)

    Set the time by inputting data as hour-minute-second. Determine the input with the ENT key for each data.
    Example: Set the time of 15:05:30.

    [1] → [5] → [ENT] → [0] → [5] → [ENT] → [3] → [0] → [ENT]

    (When the value consists of only one digit, "0" may be omitted.)
    The allowable ranges are: 0 to 23 for the hour, 0 to 59 for the minute and 0 to 59 for the second.

* ADDRESS(T)

    Set the GPIB address of the R3764/66H series. The allowable range is 0 to 30. Make sure the set values do not overlap.

* CONTROLLER(F)

    Set on/off the GPIB controller of the R3764/66H series. For details of the controller, see the "programming manual".

- PRINTER(T)

  Specify the address of the GPIB printer used for the R3764/66H series. The allowable range is 0 to 30. Make sure the set values do not overlap.

- PLOTTER(T)

  (Currently, no plotter functions are supported.)

- BAUD(F)

  Sets the RS-232 interface baud rate of the R3764/66H series. The baud rate indicates the communication rate, that is, the number of data bits which can be sent and received between the units connected through RS-232. Select one of 2400, 4800, 9600 or 19200 bps.

- CHARBIT(F)

  Set the character length of the RS-232 interface of the R3764/66H series. The character length means the number of bits of an individual character to be transmitted. Select one of 5, 6, 7 or 8 bits.

- PARITY(F)

  Set the parity check mode of the RS-232 interface of the R3764/66H series. A parity check is a way to see whether the transmitted data contains errors. Each piece of binary-noted data is added another bit (parity bit). In this method, number of transmitted data and parity bits that are set to "1"s is counted and determined to be even or odd to see whether the data is correctly sent and received.
  For an even parity (EVEN), a parity bit is added so that each piece of binary-noted data contains an even number of bits that are set to "1"s. For an odd parity (ODD), a parity bit is added so that each piece of binary-noted data contains an odd number of bits that are set to "1"s. No parity check (NONE) can also be selected.
  Select one of EVEN, ODD or NONE.

- STOPBIT(F)

  Set the stop bit length of the RS-232 interface of the R3764/66H series. The stop bit length means the duration of the stop bits. Select one of the NONE, 1, 1.5 or 2 bits.

- COUNTRY(F)

  Select the country codes "1" (for the USA) or "81" (for Japan). Use the keyboard types 101 (English, for the USA) or 106 (Japanese, for Japan). The keyboard must be connected before turning ON the power. Otherwise, the correct operation may not be guaranteed.

- HOME(F)

  Set the home directory. This must be one of A:, C: or D:.

  Note : *For the initial values of the items above, see section A.1 "Initialization".*

4.2 Description of Display Screens

4.2.1 Fluorescent Display Screen

The fluorescent screen on the R3764/66H series front panel is used for BASIC applications and file displays. This section describes about the screen in individual modes.

(1) Display screen in BASIC mode

When the R3764/66H series starts up, a fluorescent screen (hereinafter called the screen) like that shown in Figure 4-28 appears.
The BASIC mode allows a display in 32 characters × 8 lines. (For details, see sub-section 4.1.1 "BASIC Mode".)

```
BASIC Ready. (Rev X.XX)
```
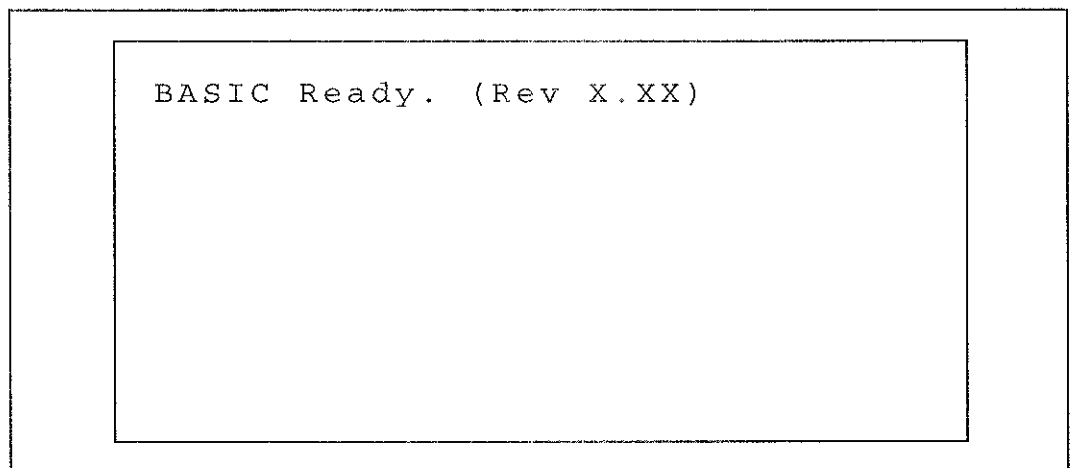
Figure 4-28 BASIC Mode Start-up Screen

(2) Display screen in LOAD mode

When the R3764/66H series enters the LOAD mode from the BASIC mode, a screen like that shown in Figure 4-29 appears. (For details, see sub-section 4.1.2 "LOAD Mode".)

```
①——   A : /                          [ F D D ]        ——②

           FILE1.BAS     R W  FILE2.BAS     R W
③——       FILE3.BAS     R W  FILE4.BAS     R W
           FILE5.BAS     R W  FILE6.BAS     R W
④——       FILE7.BAS     R W  FILE8.BAS     R W
           FILE9.BAS     R W  FILE10.BAS    R W      ——⑥
           FILE11.SYS    – –  FILE12.DOC    R –

           41  files           3071bytes  free       ——⑤
```

①: Path name   ④: File attribute
     (current drive + directory name)   ⑤: Drive information
②: Drive type of current drive   ⑥: Scroll bar
③: File name
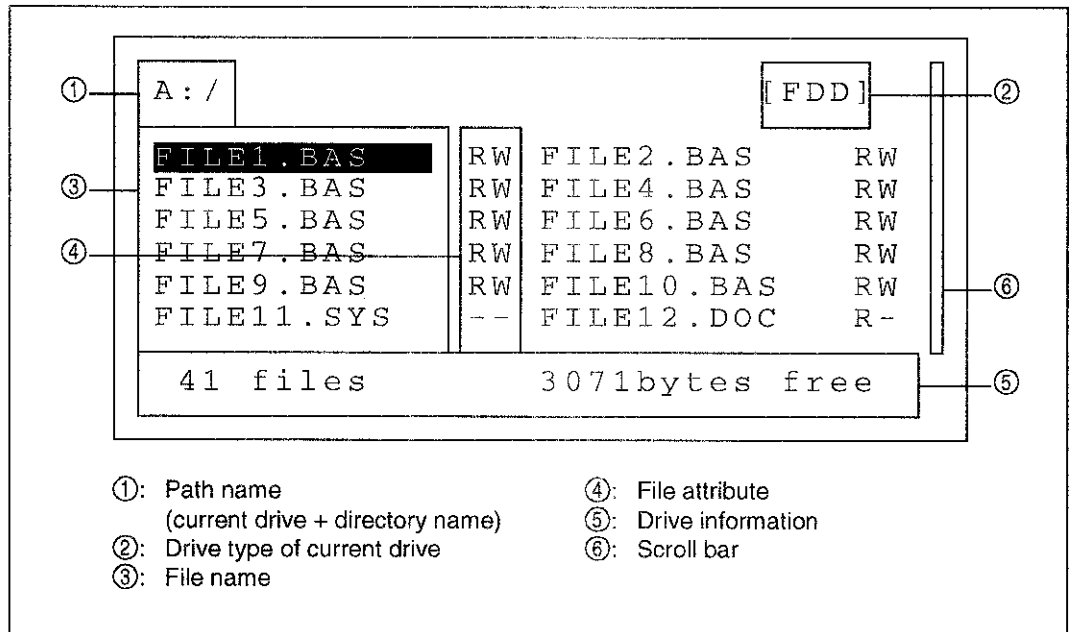
Figure 4-29 Display Screen in LOAD Mode

②: The drive type of the current drive is indicated as follows;

   [FDD]:   Floppy Disk Drive
   [RAM]:   RAM drive
   [ROM]:   ROM drive

④: The file attributes are indicated as follows;

   RW: Read/Write file (allowing both read and write)
   R-:   Read Only file
   --:   System file (inhibiting both read and write)
   <D>:   Directory (subdirectory)

⑤: The drive information indicates the number of files and free area in the current drive.

⑥: The scroll bar indicates the ratio of the displayed files to all of the files included in the current directory.

(3) Display screen in FILE mode

When the R3764/66H series enters the FILE mode from the BASIC mode, a screen like that shown in Figure 4-30 appears. (For details, see sub-section 4.1.3 "FILE Mode".)

①: Path name
     (current drive + directory name)
②: Drive type of current drive
③: File name
④: File attribute

⑤: File size (bytes)
⑥: File creation date (year-month-day)
⑦: Function key list
⑧: Scroll bar
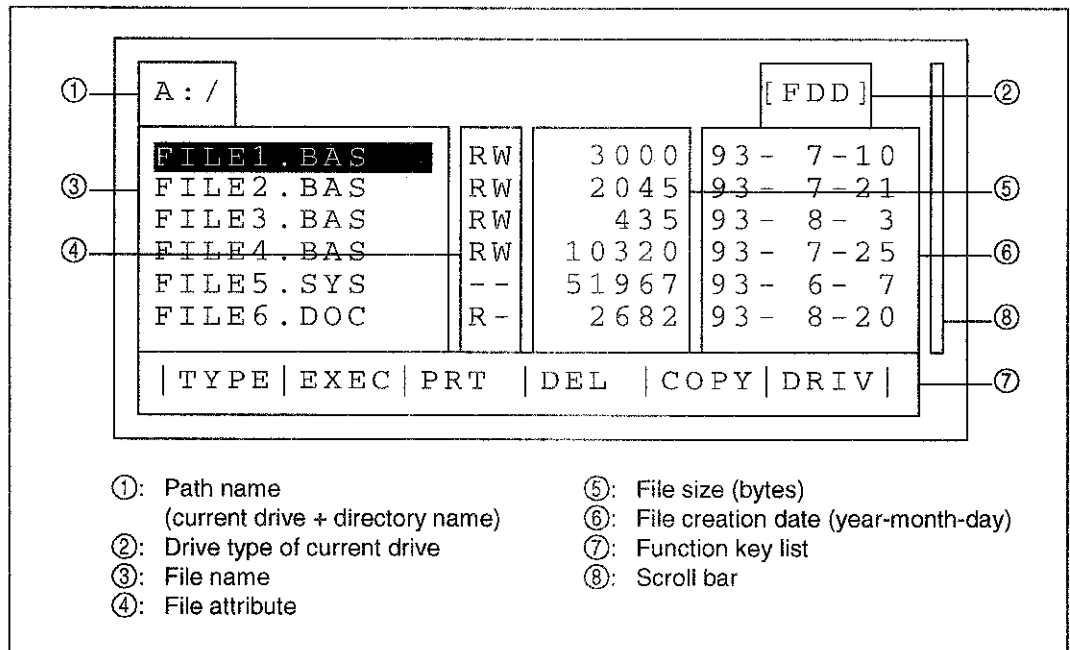
Figure 4-30 Display Screen in FILE Mode

②: The drive type of the current drive is indicated as follows;

[FDD]: Floppy Disk Drive
[RAM]: RAM drive
[ROM]: ROM drive

④: The file attributes are indicated as follows;

RW: Read/Write file (allowing both read and write)
R-:   Read Only file
--:   System file (inhibiting both read and write)
<D>:   Directory (subdirectory)

⑦: The function key list indicates the function keys available in the FILE mode.

⑧: The scroll bar indicates the ratio of the displayed files to all of the files included in the current directory.

(4) TYPE (file contents display) screen

When TYPE (K1) is selected with the function key from the FILE mode, a screen like that shown in Figure 4-31 appears if the working file is a text file. (For details, see (1) in subsection 4.1.3 "FILE Mode".)

```
①——  A : / T E S T 1 . B A S

②——  1 0  !
      2 0  ! S A M P L E   P R O G R A M
      3 0  !
      4 0  P R I N T   " T E S T   P R O G R A M   N O . 1 "
      5 0  I N P U T   " C E N T E R   F R E Q U E N C Y ( M H z ) ?
      6 0  I N P U T   " S P A N   F R E Q U E N C Y ( k H z ) ? " ,

③——  |  < -  |  - >  |       |       |       |       |

      ①: File name
          (current drive + directory name + file name)
      ②: Program list
      ③: Function key list
```

Figure 4-31 TYPE Display Screen

②: The program list is displayed in 32 characters × 6 lines. When a line exceeds 32 characters, display the exceeding characters by shifting the screen horizontally with function keys K1 and K2.
A maximum of 256 characters can be contained in one line. (If more than 256 characters are contained in a line, the characters beginning at the 257th characters are ignored.)

③: The function key list indicates the function keys available by TYPE (file contents display).

(5) PRT (printer output of file contents) screen

When PRT (K3) is selected with the function key from the FILE mode, a screen like that shown in Figure 4-32 appears if the working file is a text file. (For details, see (3) in sub-section 4.1.3 "FILE Mode".)

① A:/ [FDD]

② FILE1.BAS RW 3000 93- 7-10
FILE2.BAS RW 2045 93- 7-21
FILE3.BAS RW 435 93- 8- 3
FILE4.BAS RW 10320 93- 7-25
FILE5.SYS -- 51967 93- 6- 7
FILE6.DOC R- 2682 93- 8-20

|232C|GPIB| | | | | ③

①: Path name
(current drive + directory name)
②: Current working file
③: Function key list
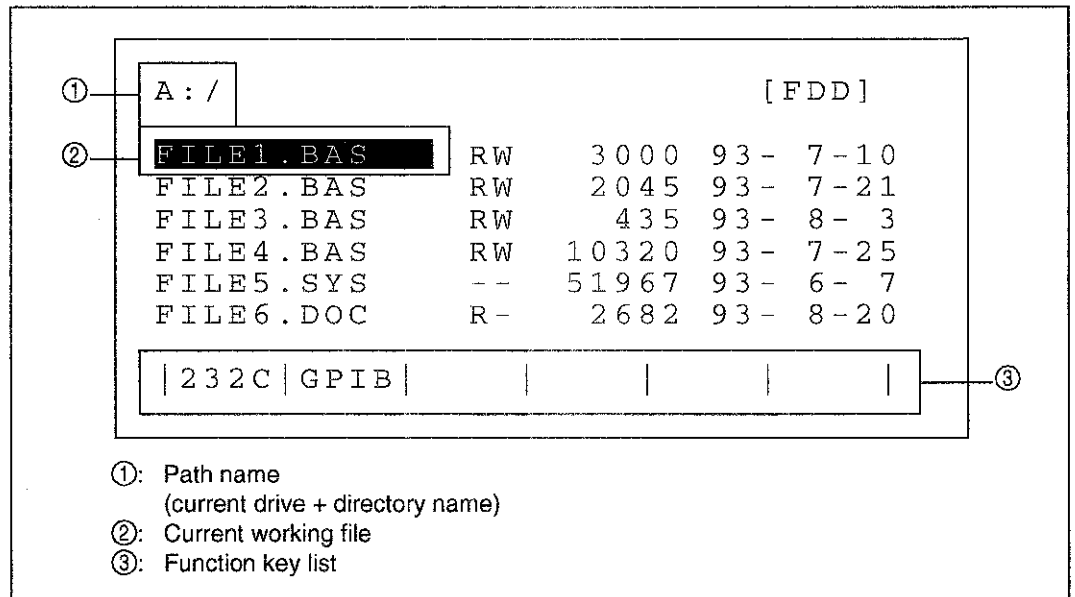
Figure 4-32 PRT Display Screen

②: The file indicated by the cursor will be output.

③: The function key list indicates the function keys available by PRT (printer output of file contents).

(6) DEL (file deletion) screen

When DEL (K4) is selected with the function key from the FILE mode, a screen like that shown in Figure 4-33 appears if the working file is a text file. (For details, see (4) in sub-section 4.1.3 "FILE Mode".)

```
     Delete  file
①── A:/TEST1.BAS


     Press  Yes<ENT>  or  No<EXIT>?
```

①: Current working file (file to be deleted)
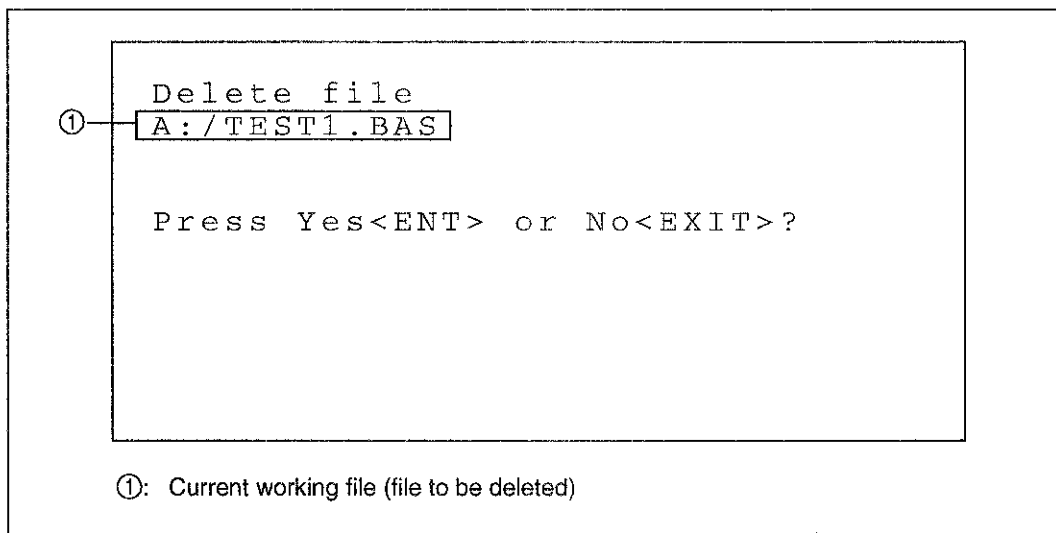
Figure 4-33 DEL Display Screen

①: The current working file is the file indicated by the cursor in the FILE mode.

(7) COPY (file contents copy) screen

When COPY (K5) is selected with the function key from the FILE mode, a screen like that shown in Figure 4-34 appears if the working file is a text file. (For details, see (5) in subsection 4.1.3 "FILE Mode".)
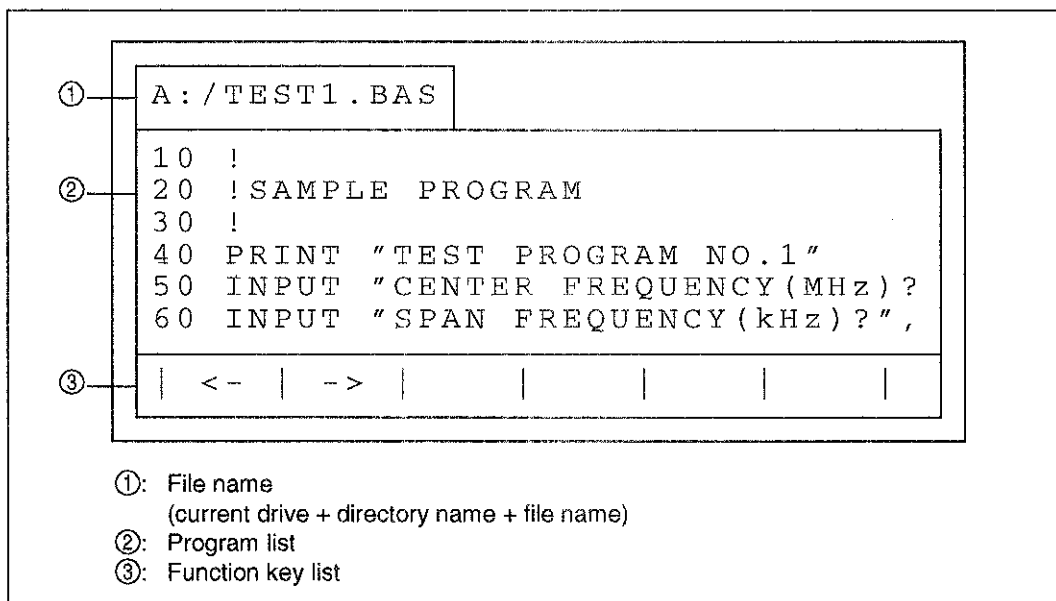
```
①──  A : /                              [ F D D ]

②──  FILE1.BAS       R W      3 0 0 0   9 3 -   7 - 1 0
     FILE2.BAS       R W      2 0 4 5   9 3 -   7 - 2 1
     FILE3.BAS       R W        4 3 5   9 3 -   8 -   3
     FILE4.BAS       R W    1 0 3 2 0   9 3 -   7 - 2 5
     FILE5.SYS       - -    5 1 9 6 7   9 3 -   6 -   7
     FILE6.DOC       R -      2 6 8 2   9 3 -   8 - 2 0

     |  A :  |  B :  |  C :  |       |       |       |   ──③
```

①: Path name
   (current drive + directory name)
②: Current working file (source file)
③: Function key list
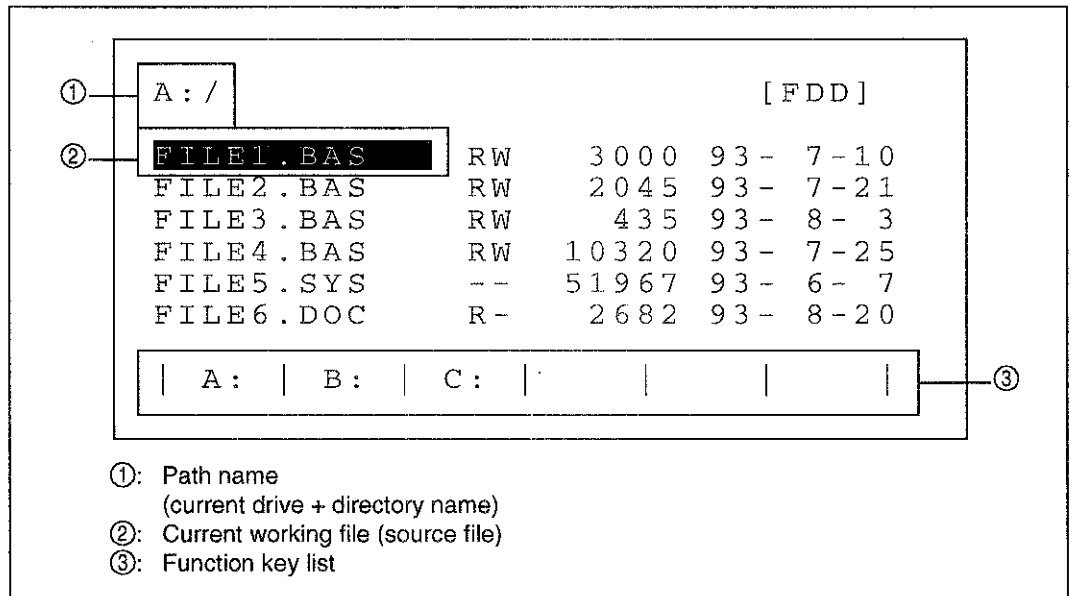
Figure 4-34 COPY Display Screen

②: The file indicated by the cursor is used as the source file.

③: The function key list indicates the function keys available by COPY (file contents copy).

When the copy destination drive is specified by the function key, a screen like that shown in Figure 4-35 appears.

```
        Copy file
①──┤ A : / T E S T 1 . B A S │
②──┤ - >  B : │

        Press  Yes<ENT>  or  No<EXIT>?
```

①: Current working file (copy source file)
②: Copy destination drive (drive specified by the function key)
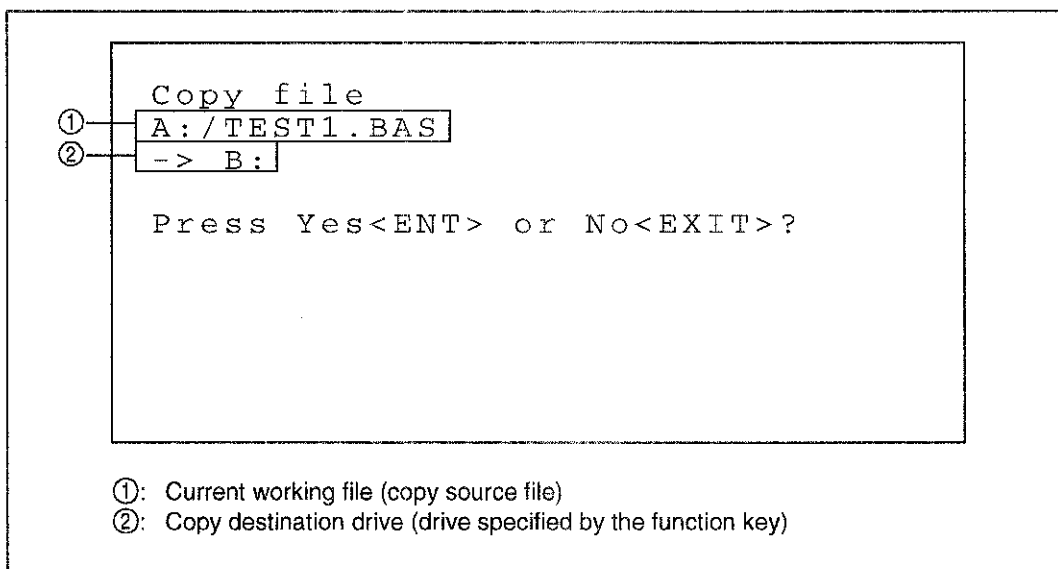
Figure 4-35 Specifying Copy Destination Drive

(8) DRIV (drive operation) screen

Pressing the DRIV (K6) key in the FILE mode causes a screen like that shown in Figure 4-36 to appear. (For details, see (6) in sub-section 4.1.3 "FILE Mode".)

```
        A : /                              [ F D D ]

        █FILE1 . BAS█   RW    3 0 0 0   9 3 -  7 - 1 0
        F I L E 2 . B A S   R W    2 0 4 5   9 3 -  7 - 2 1
        F I L E 3 . B A S   R W      4 3 5   9 3 -  8 -  3
        F I L E 4 . B A S   R W   1 0 3 2 0   9 3 -  7 - 2 5
        F I L E 5 . S Y S   - -   5 1 9 6 7   9 3 -  6 -  7
        F I L E 6 . D O C   R -    2 6 8 2   9 3 -  8 - 2 0
①──┤ │ A : │ B : │ C : │ D : │ I N I T │       │
```
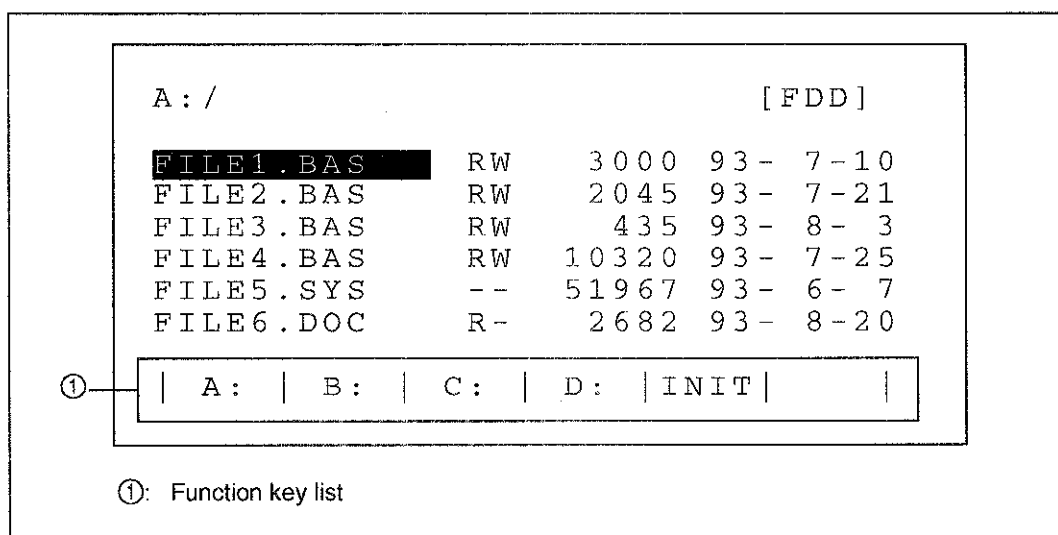
①: Function key list

Figure 4-36 DRIV Display Screen

①: The function key list indicates the function keys available by DRIV (drive operation).

(9) INIT (floppy disk initialization) screen

Pressing the INIT (K5: floppy disk initialization) key in the DRIV mode (see Figure 4-36) causes a screen like that shown in Figure 4-37 to appear. (For details, see (7) in subsection 4.1.3 "FILE Mode".)

```
Initialize  Floppy  Disk

Initialize  Type    - > ?



     | I B M  | N E C | I B M  | I B M  |        |        |
①──  | 7 2 0 K| 1 . 2 M| 1 . 2 M| 1 . 4 M|        |        |
```
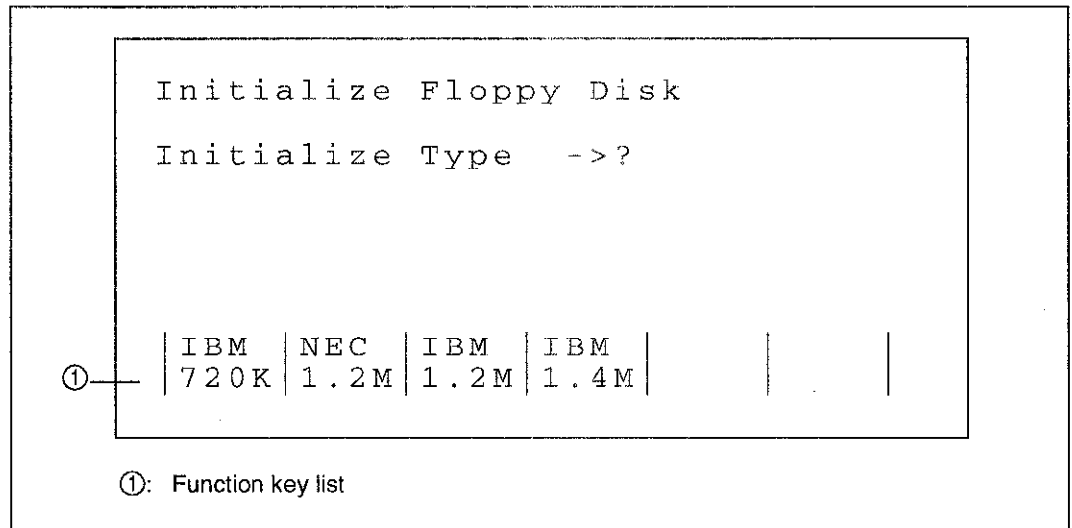
①: Function key list

Figure 4-37 INIT Display Screen

①: The function key list indicates the function keys available by INIT (floppy disk initialization).

When the initialization type is determined by the function key, a screen like that shown in Figure 4-38 appears.

```
Initialize  Floppy  Disk

①──|Initialize  Type  - >  IBM  7 2 0 K|

Press  Yes < ENT >  or  No < EXIT > ?
```

①: Selected initialization type of the floppy disk
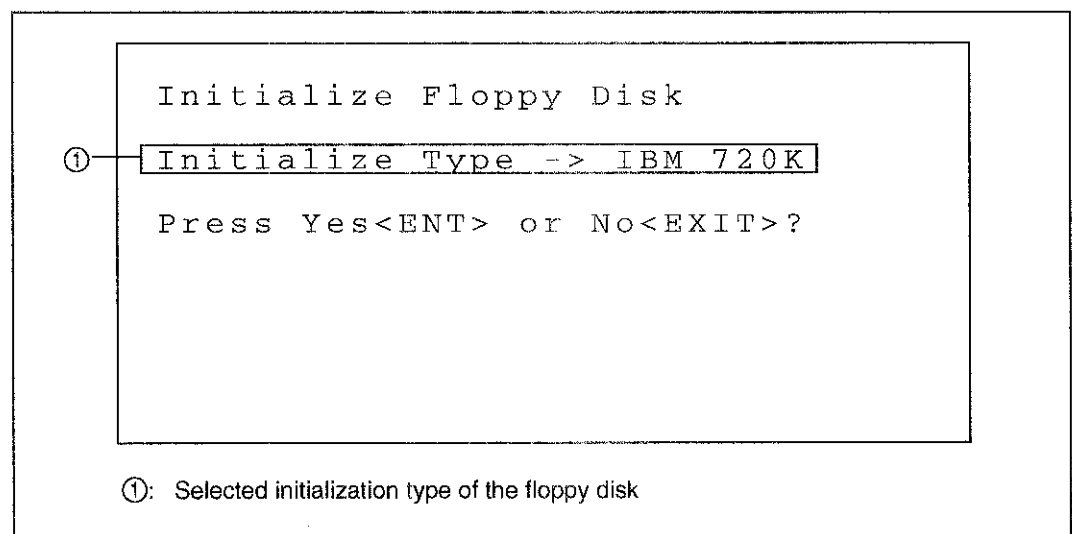
Figure 4-38 Determining Initialization Size

4.2.2 Display Screen in CONFIG Mode

When the R3764/66H series enters the CONFIG mode from the BASIC screen, a screen like that shown in Figure 4-39 appears. (For details, see sub-section 4.1.4 "CONFIG Mode".)

```
①      DATE          =   10/01/93
        TIME          =   10:00:00
        ADDRESS       =   11
        CONTROLLER    =   OFF
        PRINTER       =   12
②       PLOTTER       =   13
        BAUD          =   9600

③       ten  key  mode.
```

①: CONFIG item name
②: Set value
③: Key state (ten-key input or function key list)
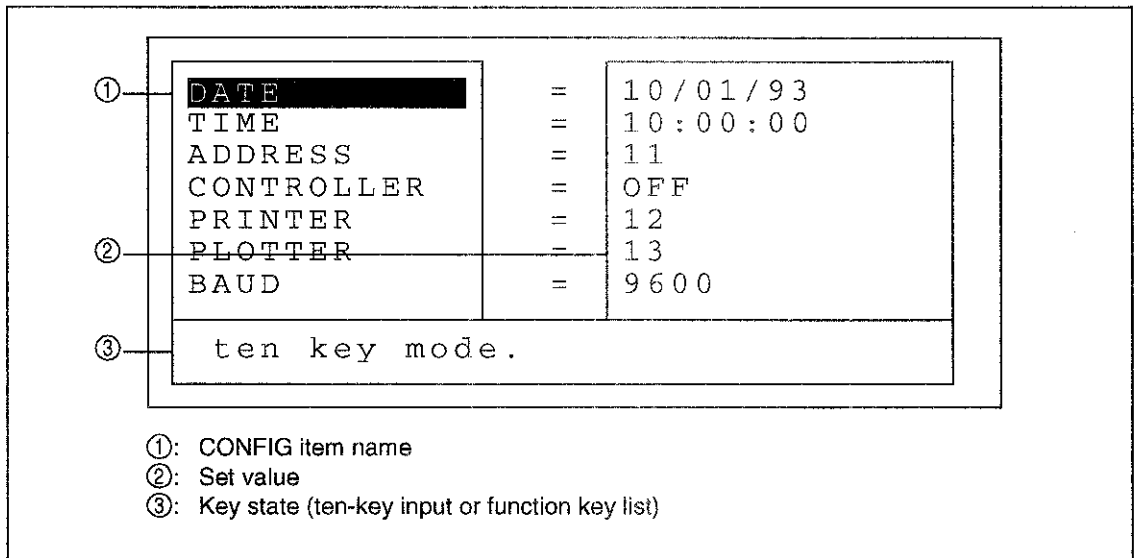
Figure 4-39 CONFIG Mode Screen

```
Save file.
C:/CONFIG.BAT
Press Yes<ENT> or No<EXIT> key.
```
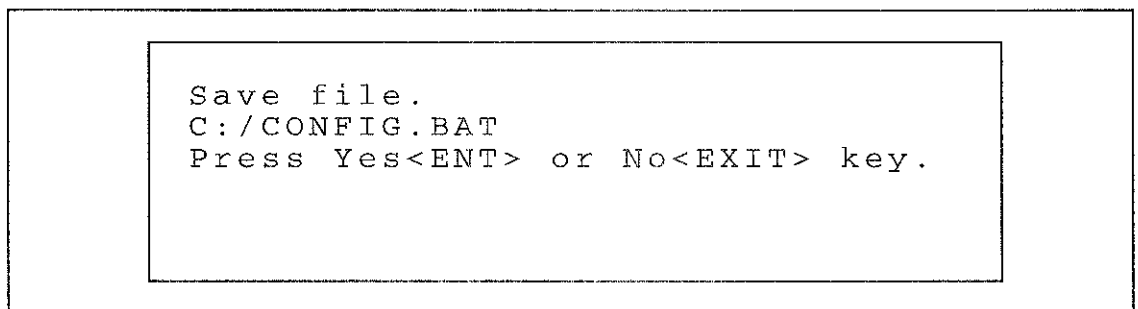
Figure 4-40 Save Check Screen in CONFIG Mode

4.3 Communication with Peripheral Devices

As standard, the R3764/66H series is equipped with the parallel I/O interface and RS-232 interface as well as the GPIB interface. With these interfaces, it can communicate with peripherals.

* Parallel I/O : Used for communication with peripheral devices such as the handler.
  (See sub-section 4.3.1.)

* RS-232 : Used for the hard copy output of internal BASIC. (See sub-section 4.3.2.)

4.3.1 Parallel I/O Port

(1) Outline

The parallel I/O port is the input/output port to communicate with the handler or peripherals. Use always the shield cable for the connection.
The parallel I/O connector on the back panel is used for communication. Figure 4-42 shows the internal pin assignment and signals of the connector. These I/O port is controlled with ENTER and OUTPUT commands.

* Input/output port
  There are two output ports and two input/output ports, as follows:

    * Port only for output : A port : 8-bit width
      B port : 8-bit width
    * Input/output port : C port : 4-bit width
      D port : 4-bit width

* Port C status output and port D status output
  Shows the settings of the input of the input/output ports C and D. It is low when C or D port is set to input, it is high when it is set to output.

* Write strobe output for output port
  By generating a negative pulse on the write strobe output, it shows a data is output to some port.

Figure below shows the timing chart of the write strobe output and data output.
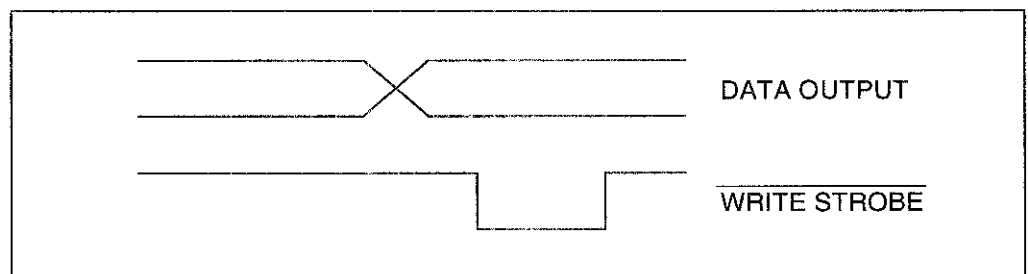
Figure 4-41 Timing Chart of WRITE STROBE

- INPUT 1
  By entering a negative pulse on the INPUT 1, the OUTPUTs 1 and 2 are set to LOW. The pulse width of the input signal to be entered in the INPUT 1 should be more than 1 μs.

- OUTPUT 1 and 2
  These two signal lines are the latch output terminals set to LOW when a negative pulse is entered on the INPUT 1. It can be set to LOW or HIGH with the BASIC command (OUTPUT).

- PASS/FAIL output
  When the result of the limit test is PASS, the output is LOW ; when FAIL, the output is HIGH.

- Write strobe output for PASS/FAIL output
  A negative pulse is output when the limit test results is on the FAIL/PASS output line.

- SWEEP END
  When the R3764/66H series finishes the sweeping, a negative pulse with a width of 10 μs is generated.

- +5V output
  +5V output is provided for the external device. The maximum current to be supplied is 100mA. This line has a fuse which will be blown when overcurrent flows for circuit protection. The blown fuse needs to be replaced.

- EXT TRIG input
  By entering a negative pulse on this line, it is possible to trigger the sweep of measurement. The pulse width should be at least 1 μs. The sweeping starts at the trailing edge of the pulse. When this signal line is used, the trigger mode should be set to External.
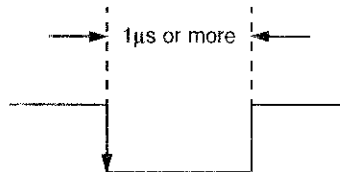
1 μs or more

(2)   Parallel I/O Connector Internal Pin Assignment and Signal Standard

| Pin No.	Signal name	Function
1	GND	Ground
2	INPUT 1	Negative logic pulse input of TTL level (width: 1 μs or more)
3	OUTPUT 1	Negative logic latch output of TTL level
4	OUTPUT 2	Negative logic latch output of TTL level
5	Output port A0	Negative logic latch output of TTL level
6	Output port A1	Negative logic latch output of TTL level
7	Output port A2	Negative logic latch output of TTL level
8	Output port A3	Negative logic latch output of TTL level
9	Output port A4	Negative logic latch output of TTL level
10	Output port A5	Negative logic latch output of TTL level
11	Output port A6	Negative logic latch output of TTL level
12	Output port A7	Negative logic latch output of TTL level
13	Output port B0	Negative logic latch output of TTL level
14	Output port B1	Negative logic latch output of TTL level
15	Output port B2	Negative logic latch output of TTL level
16	Output port B3	Negative logic latch output of TTL level
17	Output port B4	Negative logic latch output of TTL level
18	EXT TRIG	EXTERNAL TRIGGER input (width: 1 μs or more), negative logic
19	Output port B5	Negative logic latch output of TTL level
20	Output port B6	Negative logic latch output of TTL level
21	Output port B7	Negative logic latch output of TTL level
22	Input/output port C0	Negative logic state input/latch output of TTL level
23	Input/output port C1	Negative logic state input/latch output of TTL level
24	Input/output port C2	Negative logic state input/latch output of TTL level
25	Input/output port C3	Negative logic state input/latch output of TTL level
26	Input/output port D0	Negative logic state input/latch output of TTL level
27	Input/output port D1	Negative logic state input/latch output of TTL level
28	Input/output port D2	Negative logic state input/latch output of TTL level
29	Input/output port D3	Negative logic state input/latch output of TTL level
30	Port C status	TTL level, Input mode: LOW, Output mode: HIGH
31	Port D status	TTL level, Input mode: LOW, Output mode: HIGH
32	Write strobe signal	TTL level, Negative logic, Pulse output
33	PASS/FAIL signal	TTL level, PASS: LOW, FAIL: HIGH, latch output
34	SWEEP END signal	TTL level, Negative logic, Pulse output (width: 10 μs or more)
35	+5V	+5V ± 10%, 100mA MAX
36	Write strobe signal (PASS/FAIL)	TTL level, Negative logic, Pulse output
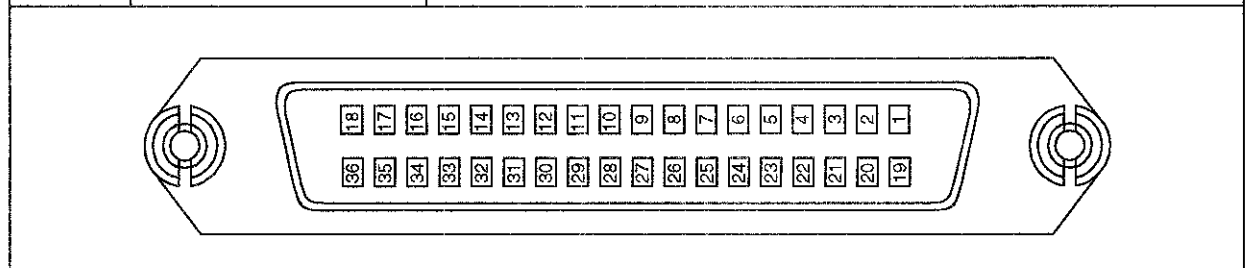
Figure 4-42 Parallel I/O(36-pin) Connector Internal Pin Assignment and Signal
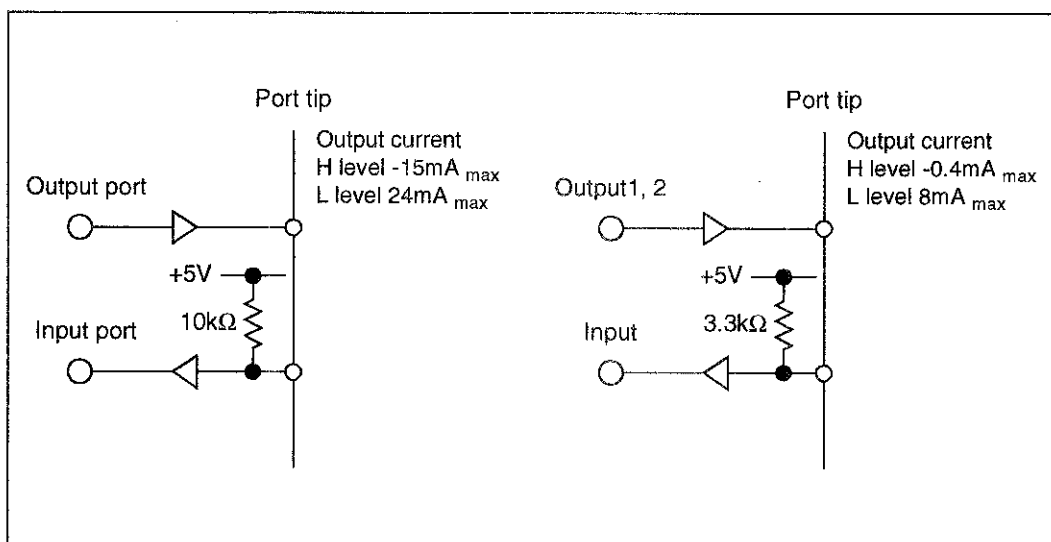
Figure 4-43 Parallel I/O Port Circuit Diagram

(3) Mode setting of port

Command	Output port	Input port
OUTPUT 36 ; 16	A, B,C, D	
OUTPUT 36 ; 17	A, B, D	C
OUTPUT 36 ; 18	A, B, C	D
OUTPUT 36 ; 19	A, B	CD

To use a parallel I/O port, first set the mode setting of port. The combination of the setting command and the input/output port is referred the above table.

Example :
    10   OUTPUT 36;19
    20   OUTPUT 33;255
    30   ENTER   37;A
     ⋮
Set the output port for port A and port B, and the input port for port CD.

(4) Operation method of each port

Describes the operation method by built-in BASIC.
OUTPUT statement (for output) and ENTER statement (for input) are used for data input/output.
In the BASIC command (OUTPUT and ENTER statements), each port is distinguished by the address used in the statement.

4.3 Communication with Peripheral Devices

(a) BASIC format

OUTPUT (address) ; (output data)
ENTER (address)   ; [variable]

(Input data are assigned to specified variable.)

(b) Address and data range

Address	Port to be used
33	Port A (Output only: OUTPUT statement only)
34	Port B (Output only: OUTPUT statement only)
35	Port C (Input/output: ENTER, OUTPUT)
36	Port D (Input/output: ENTER, OUTPUT)
37	Port CD (Input/output: ENTER, OUTPUT)

- OUTPUT 33, 34, 37

  OUTPUT × × ; 0 to 255 (8-bit)

- OUTPUT 35, 36

  OUTPUT × × ; 0 to 15 (4-bit)

  Note: The OUTPUT 35 concerns with the Set/Reset of Flip Flop.

- ENTER 35, 36

  ENTER × × ; numeric variable (4-bit) (Data from 0 to 15 are assigned.)

- ENTER 37

  ENTER 37 ; numeric variable (8-bit) (Data from 0 to 255 are assigned.)

(5) INPUT 1, OUTPUT 1 and OUTPUT 2 Terminals

By combining with the signal lines of INPUT 1, OUTPUT 1 and OUTPUT 2, convenient functions are provided to easily control external devices.
The functions are; function which sets two latch outputs of OUTPUTs 1 and 2 to LOW by pulse input to INPUT 1, and function which detects the state of OUTPUT 1 by INPUT 1. Also, the state of OUTPUTs 1 and 2 can be controlled by OUTPUT command.

(a) Setting and Reseting of OUTPUT 1 and OUTPUT 2. and Reset

The following four types are provided for set/reset as follows:

- Setting OUTPUT 1   : OUTPUT 35 ; 16
- Setting OUTPUT 2   : OUTPUT 35 ; 48
- Resetting OUTPUT 1 : OUTPUT 35 ; 80
- Resetting OUTPUT 2 : OUTPUT 35 ; 112

(b) INPUT 1 (external input)

The state of OUTPUT 1 can be observed by INPUT 1 using the ENTER statement.

ENTER 34; (numeric variable)

If 1 is assigned as the numeric variable, OUTPUT 1 is ON (Low level: negative logic), if 0, OUTPUT is OFF (High level).

Example :   10 OUTPUT 36 ; 16
             20 ENTER 34 ; A
             30 IF A<> 1 THEN GOTO 20
             40 OUTPUT 33 ; 1
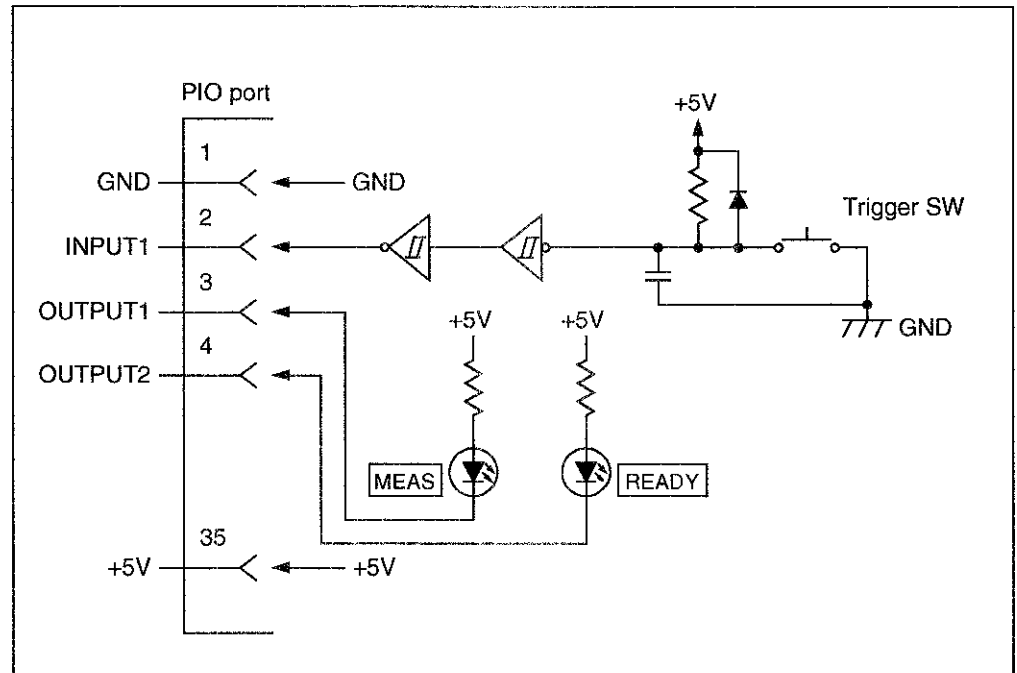   :

By observing the state of OUTPUT 1, if OUTPUT 1 is set to ON, then 1 is output to the port A.

4.3 Communication with Peripheral Devices

① Examples of INPUT 1, OUTPUT 1 and OUTPUT 2

< When program is executed by trigger switch: >

• Circuit example

PIO port

+5V

1
GND —< ← GND

2
INPUT1 —< ←   Trigger SW

3
OUTPUT1 —<   +5V   +5V

4   777 GND
OUTPUT2 —<

MEAS   READY

35
+5V —< ← +5V

• Program example

Waiting time for measurement: Represents **[READY]**.
During measurement operation: Represents **[MEAS]**.

10	OUTPUT 35 ; 80	
20	OUTPUT 35 ; 112	**[READY]**, **[MEAS]** turns OFF.
⋮		The R3764/66H series initial setup
100	OUTPUT 35 ; 48	**[READY]** turns ON.
110	ENTER 34 ; A	
120	IF A < > 1 THEN GOTO 110	Recognition of Trigger SW
130	OUTPUT 35 ; 112	**[READY]** turns OFF.
⋮		
⋮		Measurement routine
500	OUTPUT 35 ; 80	**[MEAS]** turns OFF.
510	GOTO 100	When repeating the measurement
520	STOP	

② Usage example of output ports A and B

< When LED is used for selecting devices (when port A is used): >

- Circuit example
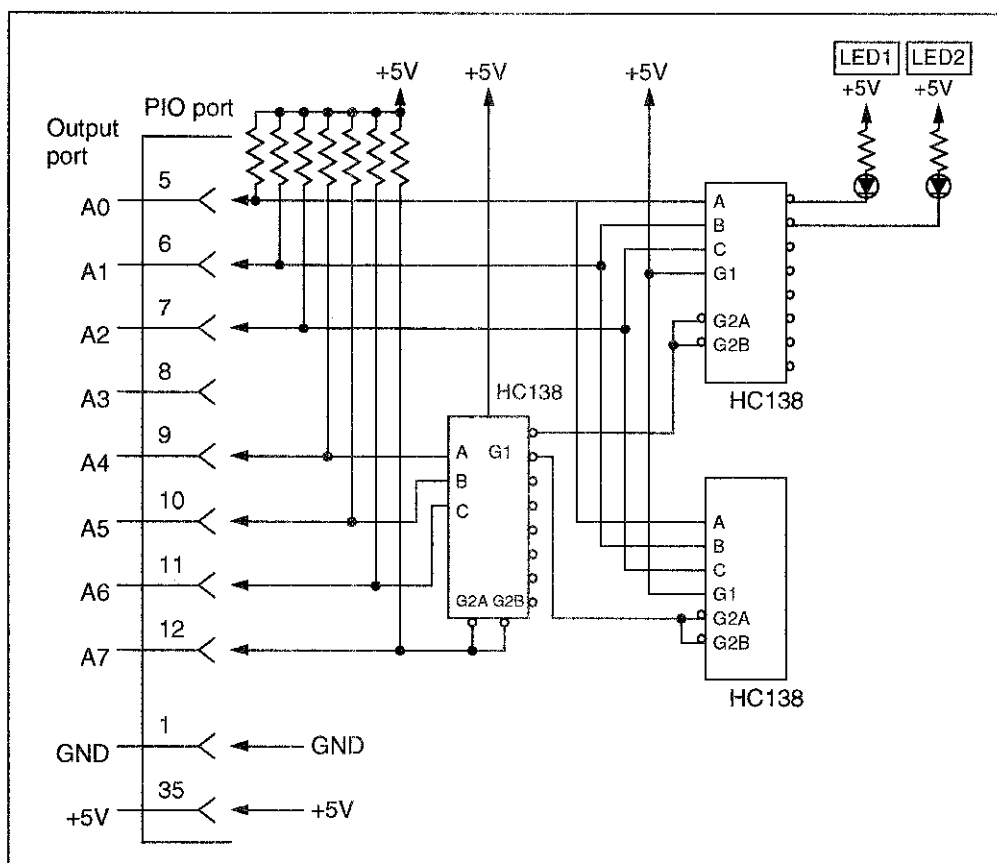
- Program example

10	OUTPUT 36 ; 16	Defines ports A, B, C and D as output port.
20	OUTPUT 33 ; 0	Initializes LED.
30		

Measurement and judgment

$\left(\begin{array}{l}\text{measurement variable: A} \\ \text{judgement range: JED0 to JED1, JED1 to JED2...}\end{array}\right)$

500	IF A > = JED0 AND A < JED1 THEN OUTPUT 33 ; 0xFF
	(When JED0 to JED1, lights up LED 1.)
510	IF A > = JED1 AND A < JED2 THEN OUTPUT 33 ; 0xFF
	(When JED1 to JED2, lights up LED 2.)

800	GOTO 30
810	STOP

③ Usage example of input/output ports C and D

< Example to change routine whether bit 0 of I/O port C is 0 or 1 >

• Circuit example
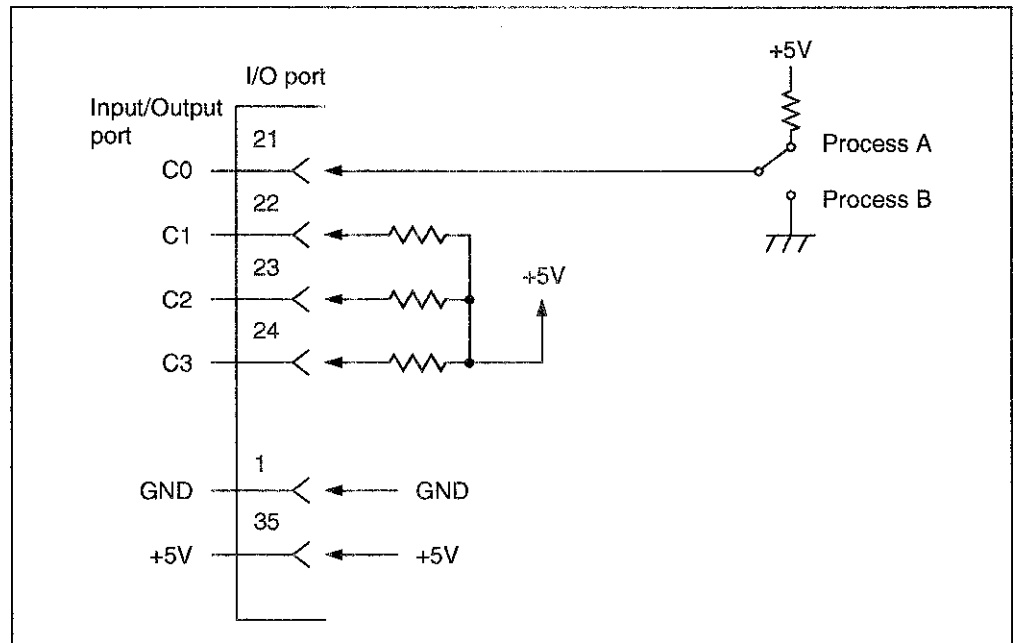
• Program example (Check the port C by pressing **[Trigger SW]** in example ①.)

10	OUTPUT 36 ; 19	Defines ports A and B as output port.
20	OUTPUT 35 ; 80	Defines ports C and D as input port.
30	OUTPUT 35 ; 112	
⋮		The R3764/66H series initial setup
100	*TRIG	
110	ENTER 34 ; A	
120	IF A < > 1 THEN GOTO *TRIG	
130	ENTER 35 ; B	Obtains value of port C.
140	IF B = 1 THEN GOTO *ROUT_B	
150	*ROUT_A	
⋮		Process A
490	GOTO *TRIG	
500	*ROUT_B	
⋮		Process B
900	GOTO *TRIG	
910	STOP	

4.3.2 RS-232 Interface

The R3764/66H series is equipped with an RS-232 interface as a standard. Therefore, data such as a measurement and analysis data can be output to an RS-232 printer.

The RS-232 interface defines mechanical and electrical characteristics of interface for connecting between data terminal and data communication device standardized by the Electronic Industries Association (EIA).

See "Regulation" for details.

(1) Connection connector and signal table

Connection connector : 25-pin D-sub connector (male type)
Signal table :

Pin No.	Signal name	Description
1	FG	Frame ground
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	SG	Signal ground
20	DTR	Data terminal ready

(2) Printer output method

The LLIST or LPRINT command is used to output to the RS-232 printer by the R3764/66H series. The setting such as a baud rate is defined by the CONTROL command.
See "Programming manual" for details.
LLIST   : Outputs BASIC program to the printer.
LPRINT   : Outputs the contents of character strings, numeric values and variables.
CONTROL : Sets the values such as a baud rate, character length and others.

Setting values at power-on
   Baud rate   : 9600 baud
   Character length : 8 bits
   Parity   : None
   Stop bit   : 1 bit

5   IN ABNORMALITIES

Read this chapter when the R3764/66H series becomes abnormal.

5.1   Inspection and Simple Troubleshooting

If the R3764/66H series becomes abnormal, check the following items before asking for repair.
When the trouble cannot be resolved by the following countermeasures, contact a nearby
ADVANTEST Sales Office. The addresses and the phone numbers are mentioned at the end of
this manual.
Their address and phone number are attached at the end of this manual. The fare will be charged
on the user even for a repair as shown in the table below.

Symptom	Assumed cause	Remedy
The power cannot be turned on.	Power cable is not surely inserted in the connector.	Turn the power switch OFF, and re-connect the power cable.
	Power fuse is blown.	Replace power fuse.
No waveform is displayed on the screen (External monitor).	Loose connection to the external monitor.	Properly connect the cable.
	Loose input cable and connector.	Properly connect the input cable and connector.
Does not sweep.	Setting of the trigger is SINGLE.	Set to CONTINUOUS.
The measured result is incorrect.	The calibration was not performed correctly.	Execute the calibration meeting the measurement.
Key does not work.	In GPIB remote control mode.	When a program is being executed, stop it and press LCL key.
Data cannot be read (recalled) from floppy disk.	Floppy disk defect.	Check operation with other floppy disk.
	FDD (Floppy disk drive) defect.	Ask ADVANTEST for repair.
	Not set to A:drive.	Set it to A:drive
Data cannot be recorded (saved) in floppy disk.	The floppy disk is not initialized.	Initialize the floppy disk.
	The write protect is enabled.	Release the write protect.
	Not set to A:drive.	Set it to A:drive.

5.2 Error Messages

This chapter explains the error messages displayed on the screen.

(1) Types of error message

① Hardware trouble   (See sub-section 5.2.1.)

② Notice of hardware information   (See sub-section 5.2.2.)

③ Operating error   (See sub-section 5.2.3.)

④ Warning of the change of internal setting and the like

(See sub-section 5.2.4.)

⑤ Notice of the completion of an operation, the operating state and the like

(See sub-section 5.2.5.)

(2) Error message display

For the error message type ③, ④ or ⑤ shown above, no error message is displayed during the GPIB command operations (including BASIC).

(3) Error message, the cause and the solving method

Explains in the following error message table.

5.2.1 Hardware Trouble

Cooling Fan Stop. Please Power OFF.	Cooling fan stopped. Please power OFF. <How to handle> Contact the nearest dealer or the sales and support office.

5.2.2 Notice of Hardware Information

Ach Overload Bch Overload	Overlevel is input into A channel. Overlevel is input into B channel. <How to handle> Check the input signal level.
External Standard In. External Trigger Ignored.	An external reference signal has been input. An input external trigger was ignored. (That does not mean a prohibiting state.) <How to handle> An external trigger (PIO-18pin) has been input in a state of not waiting for the external trigger. The state of waiting for the external trigger is the state of waiting for sweep in the external trigger mode (that is, in a state that TRIGGER[CONT] or TRIGGER[SINGLE] on the panel). If the next trigger pulse is input during a sweep in using an external trigger source, the above error occurs. Check the trigger setting and the specification of an external trigger signal.

5.2.3 Operating Error

Already Memorized.	Memorizing calibration data which *{DONE}* operation had already been executed was attempted. <How to handle> Clear the already-memorized calibration data with CLEAR CAL DATA.
Calibration aborted.	Memorizing calibration data was aborted. <How to handle> While calibration data is being memorized, if the setting is changed, the calibration is aborted. Do not change the setting until the calibration is finished.
Calibration canceled.	The acquired calibration data was cleared because the sweeping conditions were changed during calibration operated. <How to handle> The sweeping conditions must not be changed to acquire more than two calibration data. Execute the calibration data acquisition from the first.
Calibration data not found.	CORRECT ON was executed without memorized calibration data. <How to handle> Memorize the calibration data.
Can't ... When CORRECT ON.	To memorize calibration data or to execute CLEAR CAL DATA was attempted in the state of CORRECT ON. <How to handle> Choose CORRECT OFF.
Can't ... When PROG-SWEEP.	To set the number of points or to clear segments was attempted in the state of PROGRAM SWEEP. <How to handle> Specify a sweep type other than PROGRAM SWEEP and USER SWEEP.
Can't ... When USER-SWEEP.	To set the number of points or to clear segments was attempted in the state of USER SWEEP. <How to handle> Specify a sweep type other than PROGRAM SWEEP and USER SWEEP.

Operating Error

Can't find plotter !!!	A plotter was not found in a plot output. <How to handle> The plotter is not connected or GPIB address of the plotter is not correct.
Data and Coef not matched.	CORRECT ON was to be executed under a condition differing from the measurement condition under which the correction data was acquired. <How to handle> Specify the same measurement condition as the one under which the correction data was acquired.
Data and Memory not matched.	Trace operation (DATA/MEM, etc.) or memory waveform display (DISPLAY MEMORY, DISPLAY DATA/MEM) were to be executed under a condition differing from the measurement condition under which the memory waveform was acquired. <How to handle> Specify the same measurement condition as the one under which the memory waveform was acquired.
Disk not found.	A floppy disk could not be found in one of the operations LOAD MENU, STORE FILE or DATA FILE of the R3764/66H series. <How to handle> ① The floppy disk has some scratches. ② It's not formatted. ③ It's not inserted in the drive. Check the floppy disk.
Duplicate name.	The same name that has already been edited or a reserved name is input with the **[SAVE]** → {STORE FILE} → {EDIT NAME} key in the R3764/66H series. <How to handle> Input a different name.

Operating Error

File load error.	An error occurred in a *{LOAD FILE}* execution. <How to handle> Something is wrong with the floppy disk, or a file other than files stored in the R3764/66H series was specified. Check the floppy disk.
File store error.	An error occurred in a *{STORE FILE}* execution. <How to handle> ① The floppy disk has no available space. ② It's not formatted. ③ It's in the state of write protection. Check the floppy disk.
Formatting Failure.	Something was wrong in the formatting operation. <How to handle> ① The floppy disk has some scratched. ② It's in the state of write protection. Check the floppy disk.
Illegal PROG-SWEEP points.	With the number of total points of all segments being less than 3 or more than 1201, the program sweep was specified. <How to handle> Specify the number of the segment point again.
Illegal USER-SWEEP points.	With the number of total points of all segments being less than 3 or more than 1201, the user frequency sweep was specified. <How to handle> Specify the number of the segment point again.

Operating Error

Memory not found.	A trace operation (DATA/MEM, etc.) or a memory waveform display (DISPLAY MEMORY, DISPLAY DATA&MEM) was specified, without a memory waveform stored. <How to handle> Obtain the memory waveform.
None Controller.	A plot output was specified not in system controller mode. <How to handle> Set to the system controller mode.
Now plotting !!!	Another plot output was specified in the course of executing a plot output. <How to handle> Until the current plot output is completed, the following plot cannot be executed. Wait until the current plot output is completed.
Please sete 1-trace FORMAT.	With the measurement format two traces (LOGMAG&PHASE, LOGMAG&DELAY, LOGMAG&PHASE), the memory waveform display (DISPLAY MEMORY, DISPLAY DATA&MEM) was specified. <How to handle> The memory waveform display is invalid with the measurement format two traces. Set the measurement format to one trace (other than LOGMAG& PHASE, LOGMAG&DELAY or LOGMAG&PHASE).
Register recall error.	An error occurred in recalling a register. <How to handle> ① An unsaved register was specified. ② The register was damaged. Clear the register with CLEAR REG and save it again.

Operating Error

Register save error.	An error occurred in saving a register. <How to handle> Available space is not in C: drive. Delete unnecessary files.
Segment #x error.	The PROGRAM SWEEP or USER SWEEP was specified in a state that STOP FREQ of the Xth segment is higher than START FREQ of the following segment. <How to handle> Specify the frequency of the Xth segment again.
Segment not entered.	The PROGRAM SWEEP or USER SWEEP was specified without setting any segment. <How to handle> Specify the segment.
Some STD not memorized.	To execute the DONE operation was attempted without obtaining all related calibration data. <How to handle> Obtain all calibration data (OPEN, SHORT, LOAD).
Can't ... When Sub Trace ON.	The measurement format was to be set to two traces (LOGMAG &PHASE, LOGMAG&DELAY or LINMAG&PHASE) in the state that the InputMeas setting was S11&S21 or S22&S12. <How to handle> When the InputMeas setting is S11&S21 or S22&S12, the measurement format cannot be set to two traces (LOGMAG&PHASE, LOGMAG&DELAY or LINMAG&PHASE). Change the InputMeas.

5.2.4 Warning of Internal Set, Change, etc.

STIMURUS changed.	By setting the CORRECT ON, STIMULUS set value was changed internally to the one at the time the calibration data was acquired. However, only when INTERPORATE OFF setting.
CORRECT turned off.	The CORRECT setting was internally altered to OFF. <How to handle> The measuring condition in which the correction data was obtained must be the same as the current measuring condition in the correcting measurement (CORRECT ON). Therefore, when the number of points or a sweep type is altered in a state of CORRECT ON, this message is displayed and COR-RECT OFF is set.
CORR or MEM can't be saved.	Correction data and memory waveform data could not be saved by the save register operation. <How to handle> In the save register, the correction data is saved in C:drive and the memory waveform data is saved in B:drive. If available space is not in the drive, this message is displayed. (However, the setting condition in this case is saved.) Clear unnecessary register.
Data file can't be stored.	The waveform data (RAW, COEF, MEM, DATA) could not be saved with STORE FILE. <How to handle> Available space is not in A:drive (floppy disk). (However, the setting condition of the R3764/66H series is saved.) Clear unnecessary files or use another floppy disk.

Warning of Internal Set, Change, etc.

Display Mode changed.	The display mode setting was internally altered to DISPLYA DATA. <How to handle> In the memory waveform display (DISPLAY-MEMORY,DISPLAY-DATA&MEM), the measuring condition under which the memory waveform was acquired must be the same as the current measuring condition and the measuring format must be set to one trace. Therefore, when the number of points or the sweep type is altered in a state that the memory waveform is displayed, or when the measuring format is set to two traces (LOGMAG&PHASE, LOGMAG&DELAY or LINMAG&PHASE), this message is displayed and the display mode is altered to DISPLAY-DATA internally.
Sweep time increased.	The setting of the sweep time was internally altered and the sweep time was increased. <How to handle> The minimum setting value of the sweep time is decided according to the RBW setting, etc. When the sweep time is set to AUTO, this message is not displayed. Therefore, when the sweep time is not set to AUTO, if this message is displayed by altering the setting of the RBW or and the sweep time is increased. Afterward, even if the RBW setting is set to the previous setting, the sweep time setting remains the same as before.
Trace-Math turned off.	The setting of the trace operation (DATA+MEM and others) was internally altered to OFF. <How to handle> The measuring condition in which the memory waveform was obtained must be the same as the current measuring condition in the trace operation. Therefore, when the number of points or the sweep type was altered with the trace operation executed, this message is displayed and the trace operation is set to OFF.

Warning of Internal Set, Change, etc.

FORMAT changed.	Setting of the measurement format is changed internally (to LOGMAG). <How to handle> When the setting of InputMeas is S11&S21 or S22&S12, the measurement format cannot be set to 2 traces (LOGMAG& PHASE, LOGMAG&DELAY or LINMAG&PHASE). Therefore, when the measurement format is in the state of 2 traces and furthermore InputMeas is set to S11&S21 or S22&S12, this message is displayed and the measuring format is changed to LOGMAG internally.
Z0 VALUE changed.	Setting of Z0 VALUE is changed internally. <How to handle> Changing the setting of CAL KIT is interlocked to the setting of Z0 VALUE. For N (50Ω) or 3.5mm, 50Ω For N (75Ω), 75Ω.

5.2.5 Completed Operation Conditions Messages

Abort PLOT !!!	The plot output was interrupted by pushing the ABORT key, PRESET key or STOP key.
Clear Completed.	The memorized calibration data was cleared with CLEAR CAL DATA.
Formatting now ...	The floppy disk is now under formatting.
Formatting completed.	Formatting the floppy disk was correctly complete.
Store completed.	A data waveform was copied into a memory waveform with DATA → MEMORY.
Wait for sweep.	A sweep is being executed to obtain the calibration data.
Please wait, STORING FILE ...	STORE FILE is in execution.
Please wait, LOADING FILE ...	LOAD FILE is in execution.
Please wait, PURGING FILE ...	PURGE FILE is in execution.
STORE FILE completed !	STORE FILE completed normally.
LOAD FILE completed !	LOAD FILE completed normally.
PURGE FILE completed !	PURGE FILE completed normally.

6 THE PRINCIPLE

This chapter explains about the basic operation of the R3764/66H series in flow charts.

6.1 The Principle

(1) Signal source block

The R3764H series output the total output signal of 40MHz to 3.8GHz from 4.44GHz to 8.2GHz synthesizer and 4.4GHz fixed- signal generator.

The R3766H series output the total output signal of 40MHz to 3.8GHz from 4.44GHz to 8.2GHz synthesizer and 4.4GHz fixed-signal generator, and the output signal of 3.8GHz to 8.0GHz from the synthesizer directly.

The range of output level is decided according to AH, BH, and CH types as follows.
Also the range of output level can be changed by adding option 10 (output attenuator) 0dB to 70dB ATT.

The leveling of 3.8GHz to 8.0GHz is not performed.
The leveling can be done by option 11 (8GHz output AMP).

Type		40MHz to 3.8GHz	3.8GHz to 8.0GHz
R3764	AH	+17dBm to - 8dBm	—
	BH	+ 7dBm to -18dBm	—
	CH	+10dBm to -15dBm	—
R3766	AH	+17dBm to -8dBm	Fixed value of over -3dBm *
	BH	+ 7dBm to -18dBm	Fixed value of over -16dBm *
	CH	+10dBm to -15dBm	Fixed value of over -13dBm *
R3766 (with option 11)	AH	+17dBm to - 8dBm	+17dBm to - 8dBm
	BH	+ 7dBm to -18dBm	+ 7dBm to -18dBm
	CH	+10dBm to -15dBm	+10dBm to -15dBm

* : The leveling is not performed.

(2) Receiver block

① The input signal of 40MHz to 3.8GHz (for R3766H series, to 8.0GHz) is converted to 820kHz IF signal with the Sampler and input into the Mixer.

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

③ A/D processed data is performed high speed arithmetic processing with digital signal processor (DSP) and displayed in the display section.

6.2 Data Flow

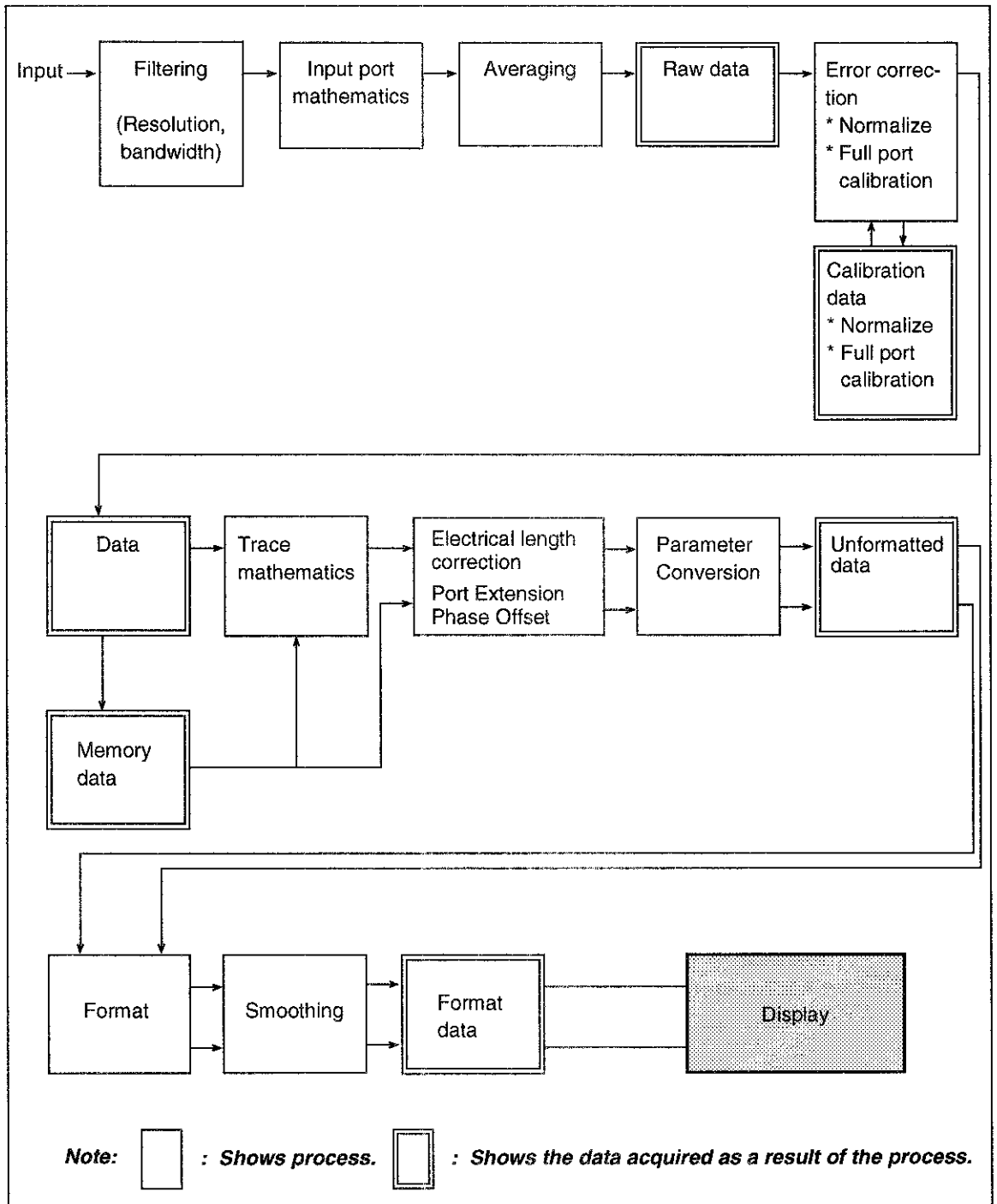The signal input into the receiver section is processed according to the following flow.

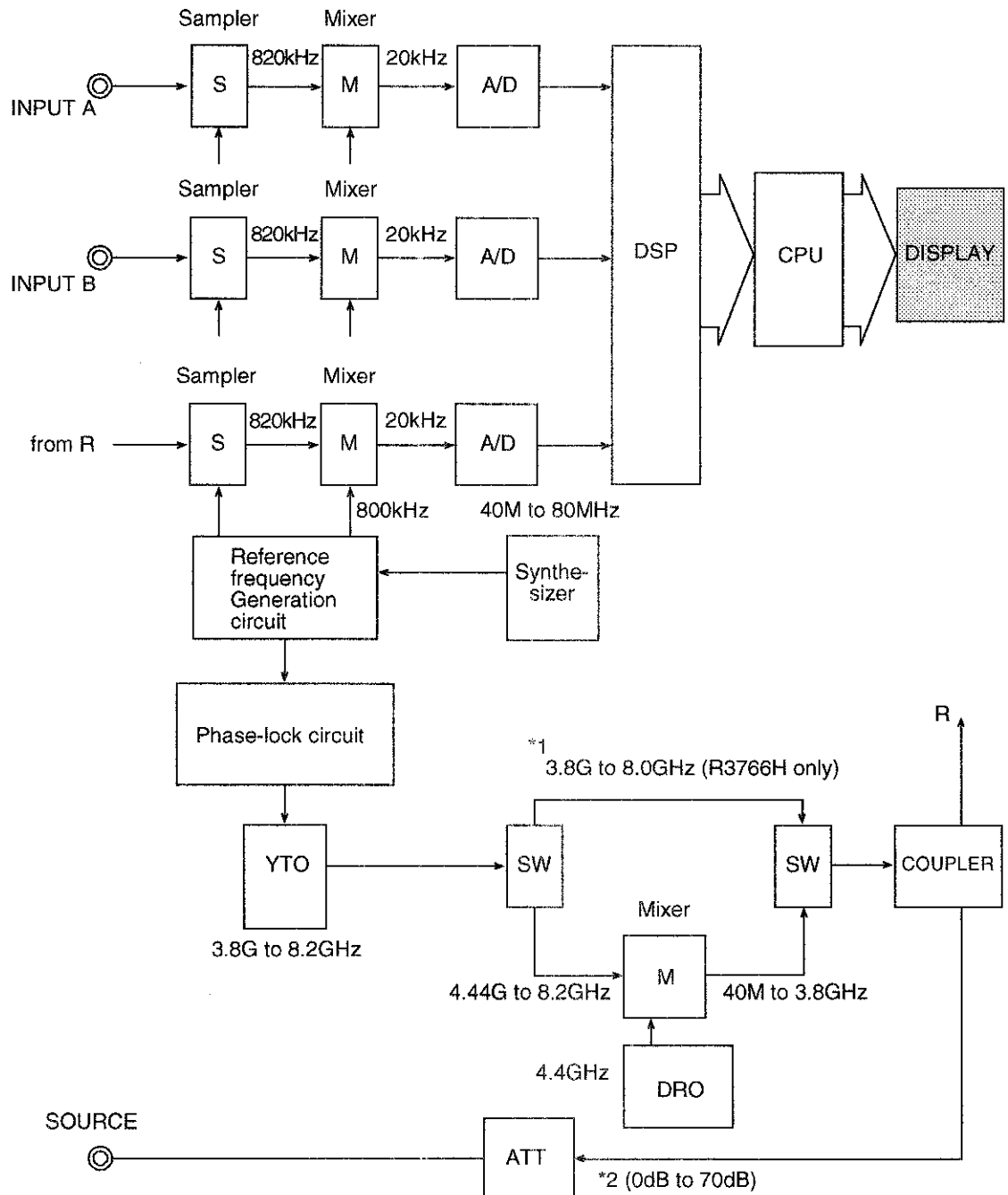

Figure 6-1 Data Flow

6.3 Block Diagram

Shows block diagram for each type, AH type, BH type and CH type.

6.3.1 R3764AH/66AH Block Diagram
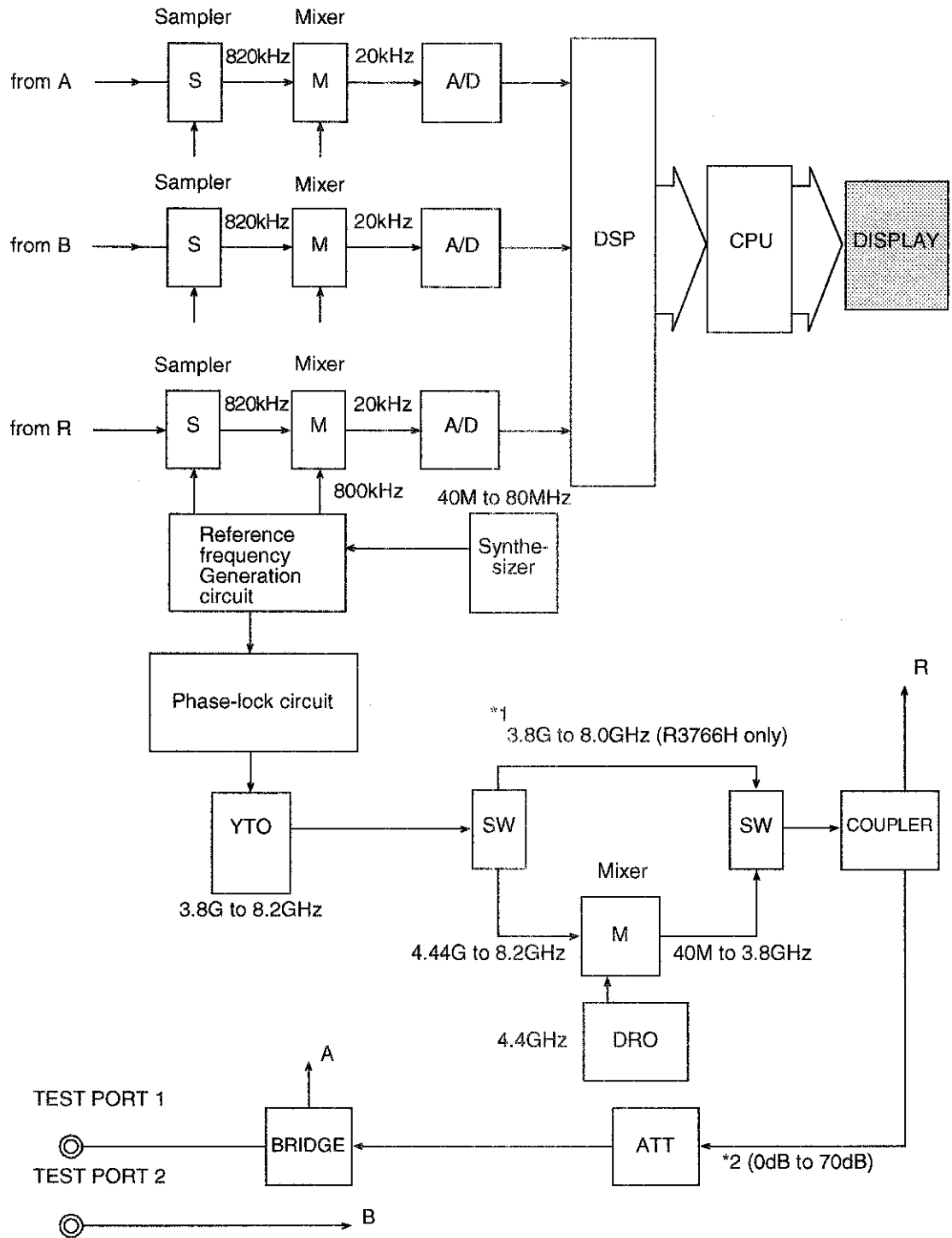

*1 : Leveling is possible with option 11 (8G output AMP).
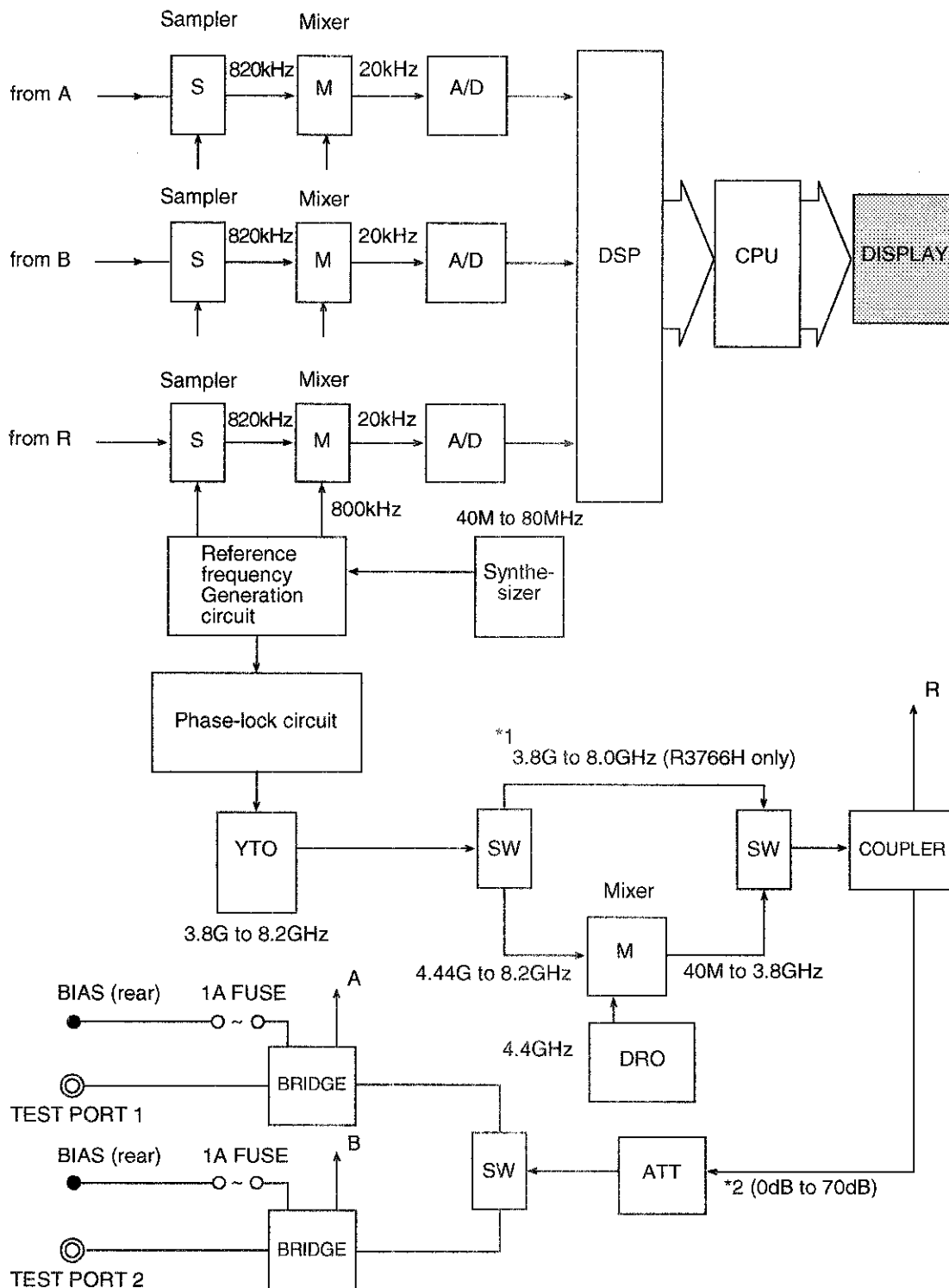*2 : Option 10 (output attenuator)

6.3.2 R3764BH/66BH Block Diagram

*1 : Leveling is possible with option 11 (8G output AMP).
*2 : Option 10 (output attenuator)

6.3.3 R3764CH/66CH Block Diagram

*1 : Leveling is possible with option 11 (8G output AMP).
*2 : Option 10 (output attenuator)

7 PERFORMANCE TEST

This chapter describes the test method to keep the performance of the R3764/66H series.

Contact ADVANTEST for other test methods than the items described in this chapter.

7.1 Preparing for a Performance Test

7.1.1 Warm up

Warm up the R3764/66H series for at least 30 minutes (pre-heating). Also, warm up each calibration standards as well.

7.1.2 Preparing Measurement Instrument

According to the test items in Table 7-1, the following measurement instruments must be required. Also, the PS/2 type keyboard 101 (English) or 106 (Japanese) is required to set the measuring conditions for this configuration. Furthermore, the monitor must be in compliance with the VGA (Video Graphics Array) in order for the user to evaluate the measuring results.

Table 7-1 Required Measurement Instrument for Performance Test (1 of 2)

Test items	Measurement Instrument		Remarks

Frequency accuracy and range	• Counter
	  Frequency :
	    40MHz to 3.8GHz (R3764H)
	    40MHz to 8.0GHz (R3766H)
	  Display : 7 digits or more
	  Accuracy : 0.1ppm or less
		R5372 (to 18GHz)
		or R5373 (to 26GHz)
		(Manufactured by ADVANTEST)
			See section 7.2

	• RF cable BNC-BNC, N-N Type		

Output/input level and flatness	• Power meter
	  Frequency : 40MHz to 3.8GHz
	  Power range: -15dBm to +17dBm
		HP436A/HP437B
		(HP438A)
		(Calibrated under the national standard)
			See section 7.3

	• Power sensor
	  Frequency : 40MHz to 3.8GHz
	  Power range: -15dBm to +17dBm
		HP8482A
		(100kHz to 4.2GHz)	

Output level linearity	• Power meter
	  Frequency :
	    40MHz to 3.8GHz (R3764H)
	  Power range: -15dBm to +17dBm
		HP436A/HP437B
		(HP438A)
		(Calibrated under the national standard)
			See section 7.4

	• Power sensor
	  Frequency : 40MHz to 3.8GHz
	  Power range: -15dBm to +17dBm
		HP8482A
		(100kHz to 4.2GHz)	

Directivity	• Calibration kit	Model 9617A3 (DC to 18GHz, N type connector)	See section 7.5

Table 7-1 Required Measurement Instrument for Performance Test (2 of 2)

| Test items	Measurement Instrument		Remarks
Test port load match	• Calibration kit	Model 9617A3 (DC to 18GHz, N type connector)	See section 7.6
	• Directivity bridge	ZRB2VAR-52 (5MHz to 3GHz)	
Crosstalk	• Calibration kit	Model 9617A3 (DC to 18GHz, N type connector)	See section 7.8

7.1.3 General Notes

* Use an AC power source having a voltage of 90V to 250V and a frequency of 48Hz to 66Hz.

* When connecting the power supply cable, turn OFF the POWER switch.

* The R3764/66H series must be tested under the following conditions:

  Temperature   : +25°C to ±5°C
  Relative humidity : 80% RH or less
  Free from dust, vibration and noise.

7.2 Frequency Accuracy and Range

Testing procedure

① Setup the R3764/66H series as follows:

For AH type, connect to "SOURCE" terminal. For BH/CH type, connect to "TEST PORT 1".

TEST PORT 1   TEST PORT 2

RF cable

To counter input

* Connect to SOURCE
  terminal when AH type.
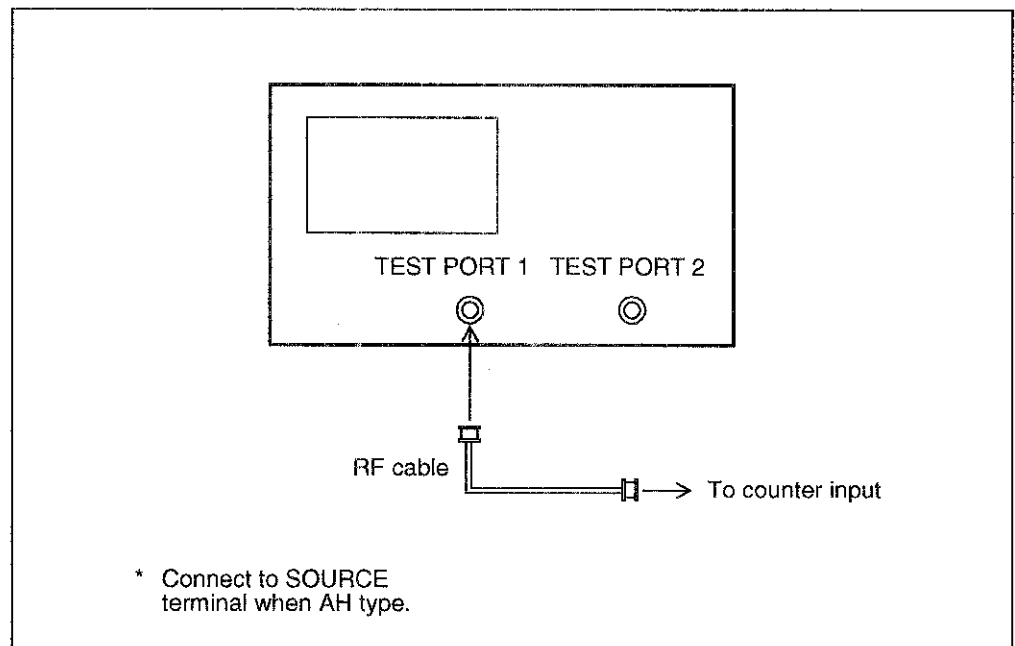
Figure 7-1 Frequency Accuracy and Range

② Set the R3764/66H series as follows:

Span   : 0Hz
Trigger mode : HOLD

③ Change any center frequency in the range of 40MHz to 3.8GHz (R3766H series; to 8.0GHz).

④ <Check> : Counter read frequency < center frequency ± center frequency × 20 × 10^{-6}

(Example)
When the center frequency is 100MHz :   100MHz ± 2kHz
That is, 99,998,000Hz to 100,002,000Hz is permitted.

7.3 Output Level Accuracy and Flatness

7.3.1 Setup

Setup the R3764/66H series as follows:

TEST PORT 1   TEST PORT 2

Power sensor

To power meter

* Connect to the SOURCE
   terminal for AH type.
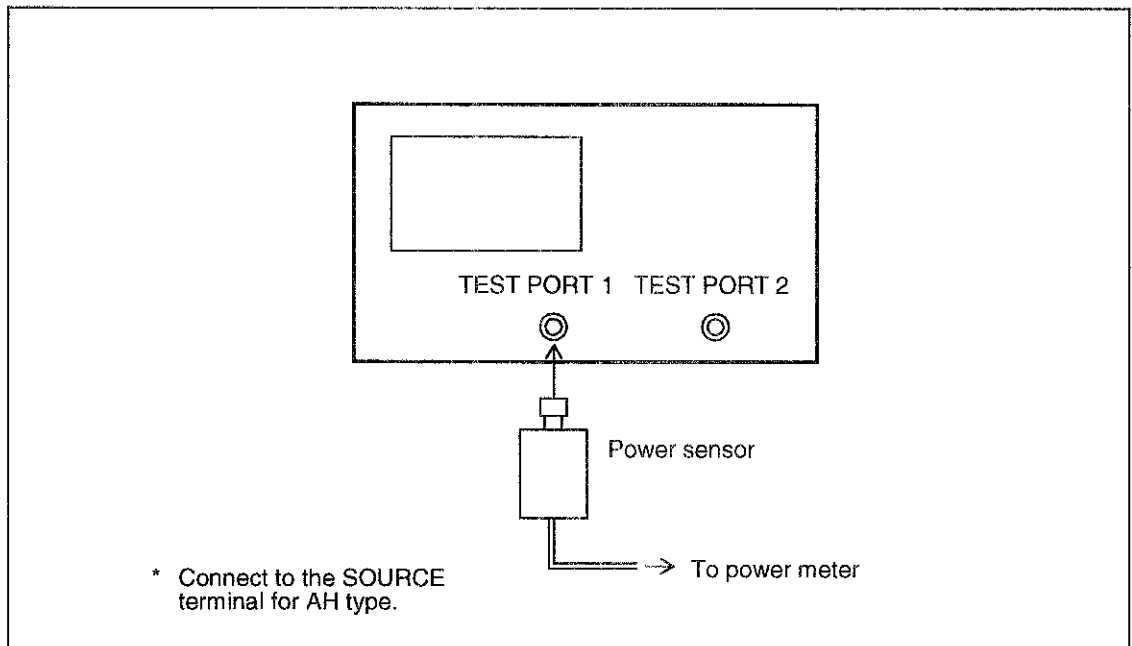
Figure 7-2 Output Level Accuracy and Flatness

7.3.2 Output Level Accuracy

Testing procedure :

① Calibrate the power meter to zero.

② Set the R3764/66H series as follows.

Center frequency :	50MHz
Span	: 0Hz
Output level	: 0dBm
Sweep mode	: HOLD

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

Connect to "SOURCE" terminal for AH type and to "TEST PORT 1" for BH/CH type.

Note: The calibration factor is set to 50MHz.

④ <Check> : Output level accuracy (at 0dBm and 50MHz) ± 0.5dB

7.3.3 Flatness

Testing procedure :

① Calibrate the power meter to zero.

② Set the R3764/66H series as follows.

Center frequency : 50MHz
Span : 0Hz
Output level : 0dBm
Sweep mode : HOLD

③ Press the **[REL]** of the power meter and set to 0dB (ratio test mode).

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

Note: Use the calibration factor at the center frequency.

⑤ <Check> : Flatness (at 0dBm) 40MHz to 3.8GHz ±2.0dB

Note: In the case of R3766H series, leveling is not performed for over 3.8GHz.

7.4 Output Level Linearity

Testing procedure :

① Calibrate the power meter to zero.

② Set the R3764/66H series as follows.

Center frequency : 50MHz
Span : 0Hz
Output level : 0dBm
Sweep mode : HOLD

③ Connect the power sensor to the output terminal and perform the measurement. (See Figure 7-3.)
Connect to "SOURCE" terminal for AH type, and to "TEST PORT 1" for BH/CH type.

* Connect to SOURCE
  terminal for AH type.
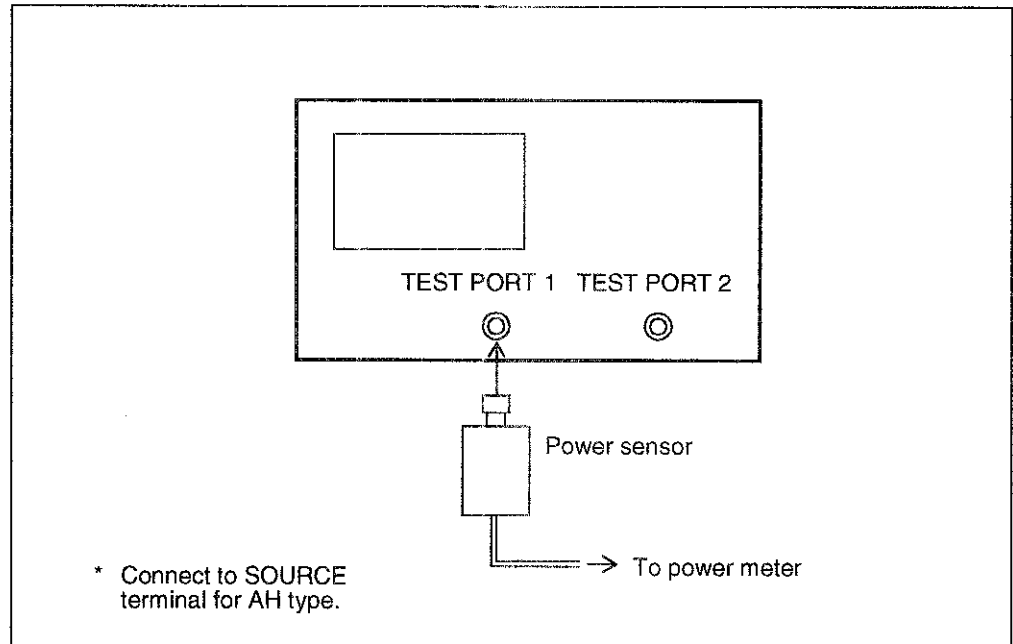
Figure 7-3 Output Level Linearity

④ Press the **[REL]** and set to 0dB (ratio test mode).

⑤ When changing the output level, obtain linearity data.

Note: The calibration factor is set to 50MHz.

⑥ <Check> :

- For R3764AH/66AH (Reference +7dBm)
  ±0.4dB (+12dBm to -3dBm)
  ±0.7dB (+17dBm to -8dBm)

- For R3764BH/66BH (Reference -3dBm)
  ±0.4dB (+10dBm to -5dBm)
  ±0.7dB (+15dBm to -10dBm)

- For R3764CH/66CH (Reference 0dBm)
  ±0.4dB (+5dBm to -10dBm)
  ±0.7dB (+10dBm to -15dBm)

7.5 Directivity (Only for mode R3764BH/CH and R3766BH/CH)

Testing procedure :

① Setup the R3764/66H series as follows.
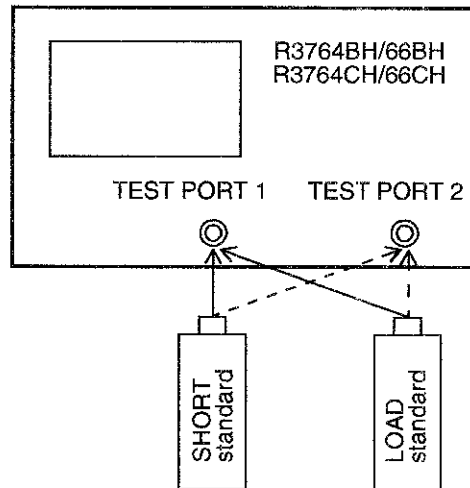

R3764BH/66BH
R3764CH/66CH

TEST PORT 1   TEST PORT 2

SHORT standard

LOAD standard

In the case of R3764BH and R3766BH,
only solid line (TEST PORT 1)

② Perform the normalize (SHORT) of TEST PORT 1.

(a) **[MEAS]** → *{S11 REFL FWD}* or **[MEAS]** → *{REFLECTION}*.
   Ctrl-M   ***F1***   ***Ctrl-M***   ***F1***

(b) Connect the short standard to TEST PORT 1.

(c) **[CAL]** → *{NORMALIZE (SHORT)}*.
   Ctrl-C   ***F2***

③ Connect the load standard to TEST PORT 1 and read the value of directivity from waveform data with the marker.

④ <Check> :The directivity of TEST PORT 1   (in 25°C ± 5°C)

         40MHz to 2.6GHz : -30dB or less
         2.6GHz to 3.8GHz : -26dB or less
         3.8GHz to 8.0GHz : -22dB or less (R3766BH/66CH only)

   • The following operating procedure is only for R3764CH/66CH.

⑤ Perform the normalize (SHORT) of TEST PORT 2.

(a) **[MEAS]** → *{S22 REFL REV}*.
   Ctrl-M   ***F4***

(b) Connect the short standard to TEST PORT 2.

(c) **[CAL]** → *{NORMALIZE (SHORT)}*.
   Ctrl-C   ***F2***

(d) Remove the short standard.

⑥ Connect the load standard to TEST PORT 2 and read the value of directivity from waveform data with the marker.

⑦ <Check> :The directivity of TEST PORT 2   (in 25°C ± 5°C)

        40MHz to 2.6GHz : -30dB or less
        2.6GHz to 3.8GHz : -26dB or less
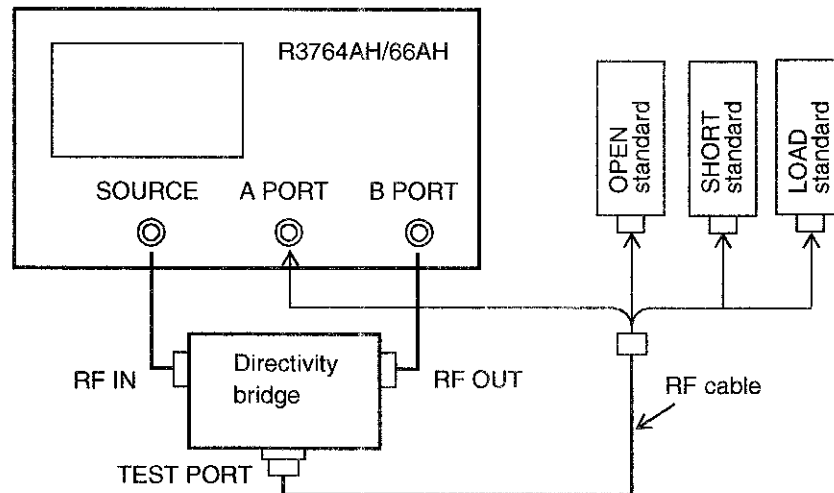   3.8GHz to 8.0GHz : -22dB or less (R3766CH only)

7.6   Load Match of Test Port

7.6.1   When R3764AH/66AH

(1)   Load match measurement of A PORT

Testing procedure :

① Setup the R3764AH/66AH as follows.

② Perform 1 port full calibration

    (a)   **[MEAS]** → *{B/R}*.
         Ctrl-M   *F2*
    (b)   **[CAL]** → *{CAL MENUS}* → *{1 PORT FULL CAL}*.
         Ctrl-C   *F3*   *F1*
    (c)   Connect the open standard to the tip of RF cable and press *{OPEN}*.
                                                               F1
    (d)   Connect the short standard to the tip of RF cable and press *{SHORT}*.
                                                              F2
    (e)   Connect the load standard to the tip of RF cable and press *{LOAD}*.
                                                                F3
    (f)   Press *{DONE 1 PORT}*.
         F8

③ Connect A PORT of the R3764AH/66AH and the tip of RF cable.

④ Read the load match of A PORT from waveform data with the marker.

⑤ <Check> : A PORT load match (in 25°C ± 5°C)

40MHz to 2.6GHz : -18dB or less
2.6GHz to 3.8GHz : -16dB or less
3.8GHz to 8.0GHz : -14dB or less (R3766AH only)

(2) Load match measurement of B PORT

Testing procedure :

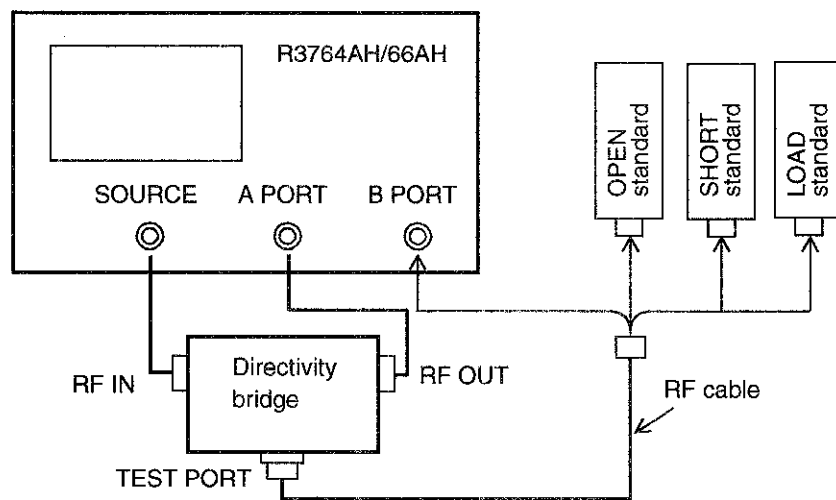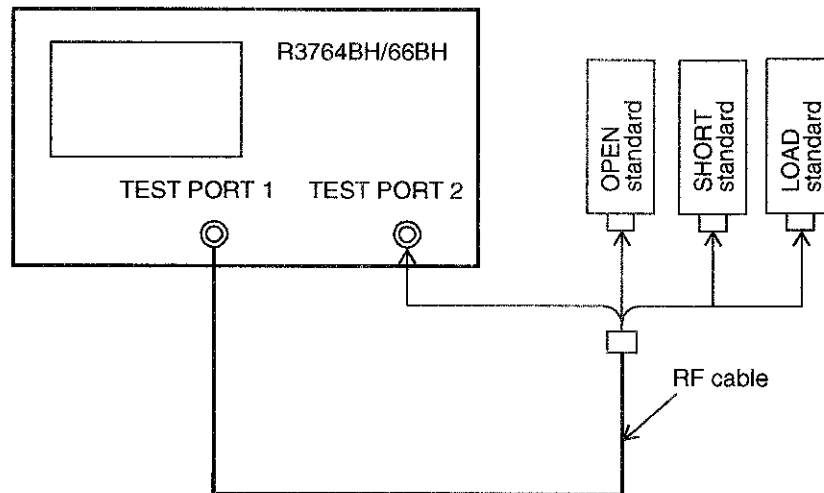① Setup the R3764AH/66AH as follows.

② Perform 1 port full calibration.

(a) **[MEAS]** → *{A/R}*.
   Ctrl-M   *F1*

(b) **[CAL]** → *{CAL MENUS}* → *{1 PORT FULL CAL}*.
   Ctrl-C   *F3*   *F1*

(c) Connect the open standard to the tip of RF cable and press *{OPEN}*.
                                                              F1

(d) Connect the short standard to the tip of RF cable and press *{SHORT}*.
                                                              F2

(e) Connect the load standard to the tip of RF cable and press *{LOAD}*.
                                                              F3

(f) Press *{DONE 1 PORT}*.
   F8

③ Connect A PORT of the R3764AH/66AH and the tip of RF cable.

④ Read the load match of B PORT from waveform data with the marker.

⑤ <Check> : B PORT load match (in 25°C ± 5°C)

40MHz to 2.6GHz : -18dB or less
2.6GHz to 3.8GHz : -16dB or less
3.8GHz to 8.0GHz : -14dB or less (R3766AH only)

7.6.2 When R3764BH/66BH

Testing procedure :

① Setup the R3764BH/66BH as follows.

② Perform 1 port full calibration

    (a) **[MEAS]** → *{REFLECTION}*.
        Ctrl-M   ***F1***

    (b) **[CAL]** → *{CAL MENUS}* → *{1 PORT FULL CAL}*.
        Ctrl-C   ***F3***   ***F1***

    (c) Connect the open standard to the tip of RF cable and press *{OPEN}*.
                                                      F1

    (d) Connect the short standard to the tip of RF cable and press *{SHORT}*.
                                                      F2

    (e) Connect the load standard to the tip of RF cable and press *{LOAD}*.
                                                       F3

    (f) Press *{DONE 1 PORT}*.
           F8

③ Connect TEST PORT 2 of the R3764BH/66BH and the tip of RF cable.

④ Read the load match of TEST PORT 2 from waveform data with the marker.

⑤ <Check> :   TEST PORT 2 load match   (in 25°C ± 5°C)

                 40MHz to 2.6GHz : -18dB or less
                 2.6GHz to 3.8GHz : -16dB or less
                 3.8GHz to 8.0GHz : -14dB or less (R3766BH only)

7.6.3 When R3764CH/66CH

(1) Load match measurement of TEST PORT 1

Testing procedure :

① Setup the R3764CH/66CH as follows.
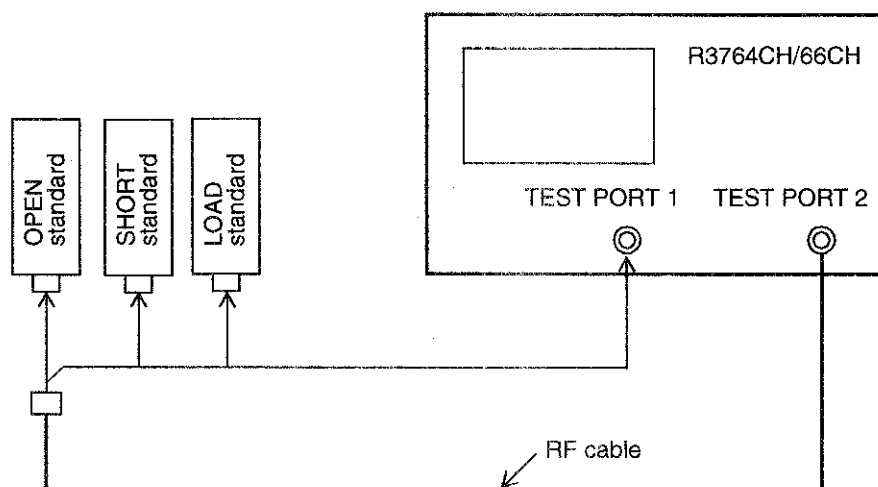
② Perform 1 port full calibration

(a) **[MEAS]** → *{S22 REFL REV}.*
    Ctrl-M   ***F4***

(b) **[CAL]** → *{CAL MENUS}* → *{1 PORT FULL CAL}.*
    Ctrl-C   ***F3***   ***F1***

(c) Connect the open standard to the tip of RF cable and press *{OPEN}.*
                                                              F1

(d) Connect the short standard to the tip of RF cable and press *{SHORT}.*
                                                              F2

(e) Connect the load standard to the tip of RF cable and press *{LOAD}.*
                                                              F3

(f) Press *{DONE 1 PORT}.*
          F8

③ Connect TEST PORT 1 of the R3764CH/66CH and the tip of RF cable.

④ Read the load match of TEST PORT 1 from waveform data with the marker.

⑤ <Check> :   TEST PORT 1 load match   (in 25°C ± 5°C)

                40MHz to 2.6GHz : -18dB or less
                2.6GHz to 3.8GHz : -16dB or less
                3.8GHz to 8.0GHz : -14dB or less (R3766CH only)

(2) Load match measurement of TEST PORT 2

Testing procedure :

① Setup the R3764CH/66CH as follows.
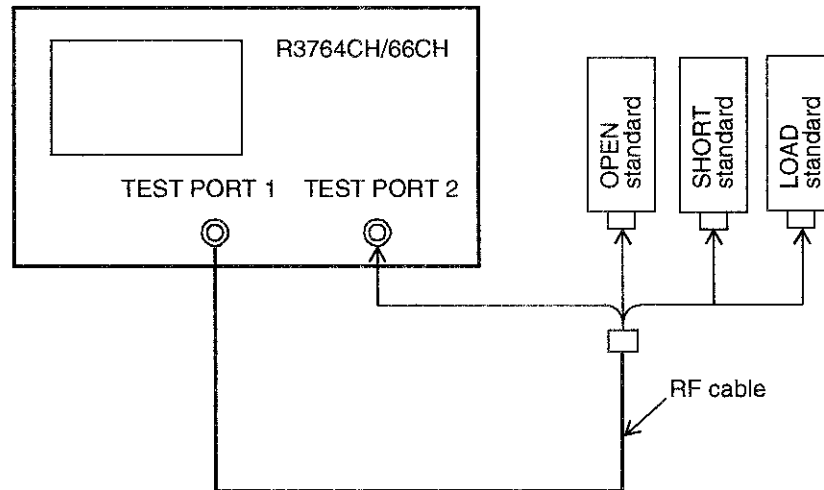
② Perform 1 port full calibration

(a) **[MEAS]** → *{S11 REFL FWD}.*
     Ctrl-M   ***F1***

(b) **[CAL]** → *{CAL MENUS}* → *{1 PORT FULL CAL}.*
     Ctrl-C   ***F3***   ***F1***

(c) Connect the open standard to the tip of RF cable and press *{OPEN}.*
                          F1

(d) Connect the short standard to the tip of RF cable and press *{SHORT}.*
                          F2

(e) Connect the load standard to the tip of RF cable and press *{LOAD}.*
                          F3

(f) Press *{DONE 1 PORT}.*
          F8

③ Connect TEST PORT 2 of the R3764CH/66CH and the tip of RF cable.

④ Read the load match of TEST PORT 2 from waveform data with the marker.

⑤ <Check> : TEST PORT 2 load match   (in 25°C ± 5°C)

             40MHz to 2.6GHz : -18dB or less
             2.6GHz to 3.8GHz : -16dB or less
             3.8GHz to 8.0GHz : -14dB or less (R3766CH only)

7.7 Noise Level

Testing procedure :

① Set the R3764/66H series as follows.

(a) **[SCALE]** → *{/DIV}* → **[1]** → **[0]** → **[x1]**.
   Ctrl-S   *F2*   *1*   *0*   *Enter*

(b) **[AVG]** → *{SMOOTHING ON}* → *{SMOOTHING APERTURE}* → **[2]** → **[0]**
   Ctrl-A   *F6*   *F7*   *2*   *0*
   → **[x1]**.
     Enter

(c) **[SYSTEM]** → *{SERVICE MENU}* → *{SERVICE MODES}*
   Ctrl-Z   *F8*   *F3*
   → *{SOURCE PLL OFF}*.
      F3

- For R3764AH/66AH, see step ②.
- For R3764BH/66BH, see step ③.
- For R3764CH/66CH, see step ④.

CAUTION!

1. *The phase lock of the signal source is set to OFF by this operation, so that the receiver section is not affected by the leakage from the signal source, by which only the noise level in the receiver section can be measured.*

2. *The input port must not be connected with anything.*

② When R3764AH/66AH

- Measure the noise level of A input and B input according to the following procedure.

(a) Press **[SYSTEM]**, *{MEAS SUB MENU}* & *{A}* to display the noise level of A input.
     Ctrl-Z   *F6*   *F5*

(b) Read the noise level value by the marker.

(c) Press **[SYSTEM]**, *{MEAS SUB MENU}* & *{B}* to display the noise level of B input.
     Ctrl-Z   *F6*   *F6*

(d) Read the noise level value by the marker.

<Check> : Noise level   under -90dB (10kHz bandwidth)

③ When R3764BH/66BH

(a) Press **[SYSTEM]**, *{MEAS SUB MENU}* & *{B}* to display the noise level of B input.
     Ctrl-Z   *F6*   *F6*

(b) Read the noise level value by the marker.

<Check> : Noise level   under -90dB (10kHz bandwidth)

④ When R3764CH/66CH

- Measure the noise level of B input.

(a) **[MEAS]** → *{S21 TRANS FWD}*.
   Ctrl-M   *F2*

(b) Press **[SYSTEM]**, *{MEAS SUB MENU}* & *{B}* to display the noise level of B input.
       Ctrl-Z   *F6*   *F6*

(c) Read the noise level value by the marker.

- Measure the noise level of A input.

(a) **[MEAS]** → *{S12 TRANS REV}*.
    Ctrl-M   *F3*

(b) Press **[SYSTEM]**, *{MEAS SUB MENU}* & *{A}* to display the noise level of A input.
       Ctrl-Z   *F6*   *F5*

(c) Read the noise level value by the marker.

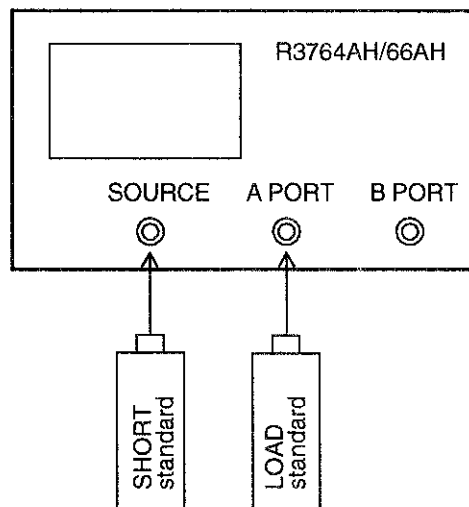<Check> : Noise level under -75dB (10kHz bandwidth)

7.8 Crosstalk

7.8.1 When R3764AH/66AH

(1) Crosstalk measurement of A PORT

Testing procedure :

① Setup the R3764AH/66AH as follows.

② Setup the R3764AH/66AH.

MEAS   : A/R
RBW   : 100Hz
Average : 16 times

③ Connect the short standard to the SOURCE terminal.

④ Connect the load standard to A PORT.

⑤ Read the crosstalk value of A PORT from the waveform data.

⑥ <Check> : Crosstalk of A PORT

40MHz to 3.8GHz : -90dB or less
3.8GHz to 5.0GHz : -80dB or less (R3766AH only)
5.0GHz to 8.0GHz : -70dB or less (R3766AH only)

(2) Crosstalk measurement of B PORT

Testing procedure :

① Setup the R3764AH/66AH as follows.

② Setup the R3764AH/66AH.

MEAS   : B/R
RBW   : 100Hz
Average : 16 times

③ Connect the short standard to the SOURCE terminal.

④ Connect the load standard to B PORT.

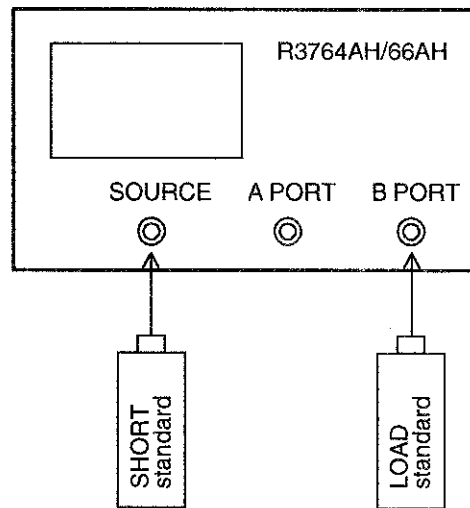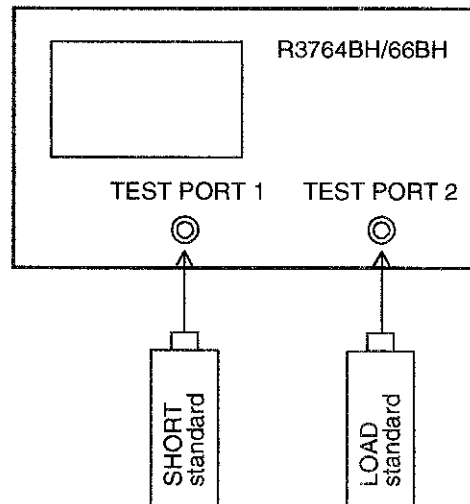⑤ Read the crosstalk value of B PORT from the waveform data.

⑥ <Check> : Crosstalk of B PORT

40MHz to 3.8GHz : -90dB or less
3.8GHz to 5.0GHz : -80dB or less (R3766AH only)
5.0GHz to 8.0GHz : -70dB or less (R3766AH only)

7.8.2 When R3764BH/66BH

Testing procedure :

① Setup the R3764BH/66BH as follows.

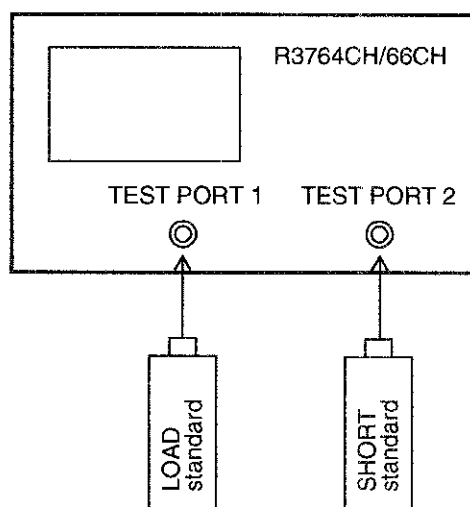② Setup the R3764BH/66BH.

MEAS   : TRANSMISSION
RBW   : 100Hz
Average : 16 times

③ Connect the short standard to TEST PORT 1.

④ Connect the load standard to TEST PORT 2.

⑤ Read the crosstalk value from the waveform data.

⑥ <Check> : Crosstalk (only about TEST PORT 2)

40MHz to 3.8GHz : -90dB or less
3.8GHz to 5.0GHz : -80dB or less (R3766BH only)
5.0GHz to 8.0GHz : -70dB or less (R3766BH only)

7.8.3 When R3764CH/66CH

(1) Crosstalk of TEST PORT 1

Testing procedure :

① Setup the R3764CH/66CH as follows.

② Setup the R3764CH/66CH.

MEAS   : S12
RBW   : 100Hz
Average : 16 times

③ Connect the short standard to TEST PORT 2.

④ Connect the load standard to TEST PORT 1.

⑤ Read the crosstalk value of TEST PORT 1 from the waveform data.

⑥ <Check> : Crosstalk of TEST PORT 1

40MHz to 2.6GHz : -90dB or less
2.6GHz to 3.8GHz : -85dB or less
3.8GHz to 5.0GHz : -70dB or less (R3766CH only)
5.0GHz to 8.0GHz : -60dB or less (R3766CH only)

(2) Crosstalk of TEST PORT 2

Testing procedure :

① Setup the R3764CH/66CH as follows.

② Setup the R3764CH/66CH.

MEAS : S21
RBW : 100Hz
Average : 16 times

③ Connect the short standard to TEST PORT 1.

④ Connect the load standard to TEST PORT 2.

⑤ Read the crosstalk value of TEST PORT 2 from the waveform data.

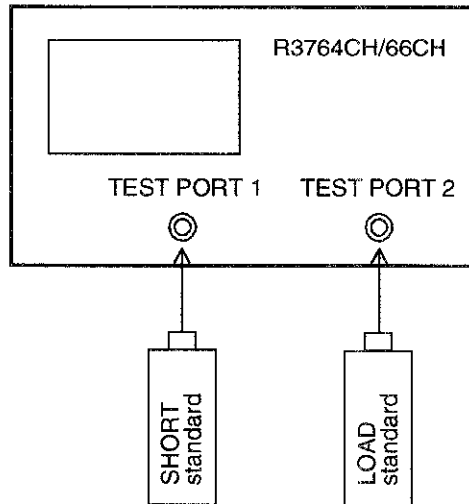⑥ <Check> : Crosstalk of TEST PORT 2

     40MHz to 2.6GHz : -90dB or less
     2.6GHz to 3.8GHz : -85dB or less
     3.8GHz to 5.0GHz : -70dB or less (R3766CH only)
     5.0GHz to 8.0GHz : -60dB or less (R3766CH only)

8   SPECIFICATIONS

This chapter describes about the function of the R3764/66H series and the performance/specification together.

(1)   Measurement Function

Sweep channels	2 channels (CH1, CH2)
Display channels	4 channels (CH1, CH2, CH3, CH4)
Traces	2 traces/channel
Display parameters	A/R/, B/R, A, B, R (R3764AH/66AH)
	TRANSMISSION, REFLECTION, TRANS&REFL (R3764BH/66BH)
	S11, S21, S22, S12, S11&S21, S22&S12 (R3764CH/66CH)
Parameter conversions	Z, Y, 1/S (All types)
Formats	
Rectangular coordinates display	The real part and the imaginary part of logarithmic/linear magnitude, phase, group-delay or complex number. I Z I, R, X (for impedance-conversion measurement) I Y I, G, B (for admittance-conversion measurement) Phase-delay display function
Smith chart	Reading with marker is for logarithmic/linear magnitude & phase, real part + imaginary part, R + jX, G + jB.
Polar coordinates display	Reading with marker is for logarithmic/linear magnitude & phase, real part + imaginary part.

(2)   Signal Source Section

Measurement frequency	
Range	40MHz to 3.8GHz (R3764AH/BH/CH) 40MHz to 8.0GHz (R3766AH/BH/CH)

Setting resolution
    Measurement resolution
    Accuracy
	1Hz
	$\pm$0.005ppm
	$\pm$20ppm (25°C $\pm$ 5°C)

Output level (40MHz to 3.8GHz)	
Range	+17dBm to -8dBm (R3764AH/66AH) +7dBm to -18dBm (R3764BH/66BH) +10dBm to -15dBm (R3764CH/66CH)
Resolution	0.01dB
Accuracy	$\pm$0.5dB (50MHz, 0dB, 25°C $\pm$ 5°C) (at Test Port 1 when R3764CH/66CH)

Output level linearity	25°C $\pm$ 5°C
	• +7dBm reference when R3764AH/66AH
	  $\pm$0.4dB (+12dBm to -3dBm)
	  $\pm$0.7dB (+17dBm to -8dBm)
	• -3dBm reference when R3764BH/66BH
	  $\pm$0.4dB (+10dBm to -5dBm)
	  $\pm$0.7dB (+15dBm to -10dBm)
	• 0dBm reference when R3764CH/66CH
	  $\pm$0.4dB (+5dBm to -10dBm)
	  $\pm$0.7dB (+10dBm to -15dBm)

Flatness	2.0dBp-p (25°C $\pm$ 5°C) (at Test Port 1 when R3764CH/66CH)
Output level (3.8GHz to 8.0GHz)	Output level fixed -3dBm or more (R3766AH) -16dBm or more (R3766BH) -13dBm or more (R3766CH)
Output impedance	50Ω

Signal Source Section (continued)

Signal purity	
Harmonic distortion	≤-20dBc (40MHz to 3.8GHz, 25°C ± 5°C when maximum output)
Non harmonic spurious	≤-25dBc (40MHz to 3.8GHz, 25°C ± 5°C when maximum output)
Phase noise	10kHz offset, 1kHz bandwidth, -85dBc+20log (f/40MHz) when maximum output
Sweep function	
Sweep parameter	Frequency, signal level
Maximum sweep range	
Frequency	40MHz to 3.8GHz (R3764AH/BH/CH) 40MHz to 8.0GHz (R3766AH/BH/CH)
Signal level (40MHz to 3.8GHz)	+17dBm to -8dBm (R3764AH/66AH) +7dBm to -18dBm (R3764BH/66BH) +10dBm to -15dBm (R3764CH/66CH) Start/Stop or Center/Span
Sweep type	Linear/log frequency sweep, sweep by partial and arbitrary frequency, level sweep and CW (single frequency) sweep
Sweep time	0.15ms/1 point (when the normalize cal. used) 0.25ms/1 point (when the 2 port full cal. used) However, the minimum sweeping time is different depending on the measuring format, the type of error correction, the sweeping width per point, the number of measurement points and the measuring IF bandwidth.
Measurement point	3, 6, 11, 21, 51, 101, 201, 301, 401, 601, 801, 1201 point
Sweep trigger	Sets with either 'sequence, hold, single sweep' or 'external trigger'.
Sweep mode	
Dual sweep	Sweeps 2 channels in the same frequency range.
Alternate sweep	2 channels (CH1 and CH2) can be measured with different sweep types and in different frequency ranges.

(3) Characteristic of the Receiver Part

Resolution bandwidth	10kHz to 10Hz (changeable at 1 and 3 steps)
Magnitude characteristic	
Magnitude resolution	0.001dB
Dynamic accuracy	Reference, -20dB from the test port maximum input level * When isolation correction 0dB to -10dB : $\pm$0.3dB (40MHz $\leq$ f $\leq$ 3.8GHz) $\pm$0.8dB (3.8GHz $\leq$ f $\leq$ 8.0GHz) -10dB to -20dB : $\pm$0.05dB (40MHz $\leq$ f $\leq$ 3.8GHz) $\pm$0.2dB (3.8GHz $\leq$ f $\leq$ 8.0GHz) -20dB to -50dB : $\pm$0.05dB -50dB to -60dB : $\pm$0.10dB -60dB to -70dB : $\pm$0.40dB -70dB to -90dB : $\pm$1.00dB
Ratio measurement accuracy	$\pm$1.00dB (25°C $\pm$ 5°C)
Phase characteristic	
Measurement range	$\pm$180°C (More than $\pm$180°C can be displayed depending on the display extension function.)
Phase resolution	0.01°
Frequency characteristic	$\pm$5° (10dB, 25°C $\pm$ 5°C)
Dynamic accuracy	Reference, -20dB from the test port maximum input level * When isolation correction 0dB to -10dB : $\pm$5.0° -10dB to -20dB : $\pm$0.3° (40MHz $\leq$ f $\leq$ 3.8GHz) $\pm$0.8° (3.8GHz $\leq$ f $\leq$ 8.0GHz) -20dB to -50dB : $\pm$0.3° -50dB to -60dB : $\pm$0.4° (40MHz $\leq$ f $\leq$ 3.8GHz) $\pm$0.8° (3.8GHz $\leq$ f $\leq$ 8.0GHz) -60dB to -70dB : $\pm$1.5° -70dB to -80dB : $\pm$4.0° -80dB to -90dB : $\pm$8.0°

Characteristic of the Receiver Part (continued)

Group delay characteristic	
Range	Can be obtained by the following equation. $$\tau = \frac{\Delta\phi}{360 \times \Delta f}$$ $\Delta\phi$: Phase Δf : Aperture frequency (Hz)
Measurement range	1ps to 250s
Group delay resolution	1ps
Aperture frequency	equals Δf and can be set optionally up to 100% from '$\dfrac{100}{\text{measurement point-1}} \times 2\%$' of the frequency span in the resolution of '$\dfrac{100}{\text{measurement point-1}} \times 2\%$'.
Accuracy	$$\frac{\text{phase accuracy}}{360 \times \text{aperture frequency (Hz)}}$$

(4) Test Port Characteristic

Test port load match	* 25°C ± 5°C 18dB (40MHz to 2.6GHz) 16dB (2.6GHz to 3.8GHz) 14dB (3.8GHz to 8.0GHz) *R3766AH/BH/CH only
Directivity	* 25°C ± 5°C 30dB (40MHz to 2.6GHz) 26dB (2.6GHz to 3.8GHz) 22dB (3.8GHz to 8.0GHz) *R3766BH/CH only

Crosstalk	◦ When R3764AH/BH
	  90dB (40MHz to 3.8GHz)
	
	◦ When R3764CH
	  90dB (40MHz to 2.6GHz)
	  85dB (2.6GHz to 3.8GHz)
	
	◦ When R3766AH/BH
	  90dB (40MHz to 3.8GHz)
	  80dB (3.8GHz to 5.0GHz)
	  70dB (5.0GHz to 8.0GHz)
	
	◦ When R3766CH
	  90dB (40MHz to 2.6GHz)
	  85dB (2.6GHz to 3.8GHz)
	  70dB (3.8GHz to 5.0GHz)
	  60dB (5.0GHz to 8.0GHz)

Connector	N type (f), 50Ω

Noise level	From the test port maximum input level
	  -90dB (3kHz bandwidth)
	  -100dB (10Hz bandwidth)

Maximum input level	0dBm (R3764AH/BH, R3766AH/BH) +12dBm (R3764CH, R3766CH)
Maximum port-biased	±30V_{DC}, 0.5A (R3764CH, R3766CH)
Input head damage level	+21dBm, ±30V_{DC}

(5)   Error Correction Function

Normalize	Frequency response (both magnitude and phase) in transmission measurement and reflection measurement is corrected.
Normalize & isolation	Frequency response and isolation in transmission measurement are corrected.
1 port calibration	The error caused by bridge directivity, frequency response and source match in reflection measurement is corrected. For the error correction, the short, the open and the load are required.
2 ports calibration	The error caused by directivity, source match, load match, frequency response and isolation in transmission measurement and reflection measurement is corrected. (R3764CH/66CH only)
Data averaging	Average of each sweep data (vector value) The average factor can be set between 2 to 999.
Data smoothing	Average of moving between adjacent measurement points.
Electrical length correction	Add equivalent electrical length or delay-time to the measured phase and the group delay-time.
Phase offset correction	Add phase offset to the measured phase constantly.
Calibration by frequency interpolation	In the calibration by frequency interpolation mode, the error count is performed the difference calculation even when the frequency and the horizontal axis point number are changed. Change of the frequency range (start/stop) is applied within the frequency range of the first calibration.

(6)   Display Section

Indicator	fluorescent display tube, Green
Resolution	256 × 64 dots
Display mode	Character display, 32 × 8 characters

(7) Program Function

BASIC controller function	The controller function with standard function can control the R3764/66H series itself and other instruments equipped with GPIB interface.
Built-in function	The measured data can be analyzed at a high speed with the built-in function.
FDD function	Based on MS-DOS format. For 3 modes (DD 720KB, HD 1.2MB/1.4MB)

(8) Connection to External Devices

Signal for external display	15 pins, D-SUB connector (VGA)
GPIB data output & remote control	IEEE488 applicable
Parallel I/O output	TLL level, 8-bit output (2-ports) 4-bit input/output (2 ports)
Serial port	Based on RS-232
Keyboard	Based on IBM PC-AT
External reference frequency input	Inputable range 1MHz, 2MHz, 5MHz, 10MHz ±10ppm More than 0dBm (50Ω)
Power source for probing	±15V ±0.5V, 300mA

(9) General SpecificationMay 28/97

Operating environment	
When FDD used.	Temperature range +5 to +40°C Relative humidity under 80% (non-condensing)
When FDD unused.	Temperature range 0 to +50°C Relative humidity under 80% (non-condensing)
Storing environment	-20 to +60°C
Power source	AC100V to 120V, 50Hz/60Hz AC220V to 240V, 50Hz/60Hz * Auto-switch between 100VAC and 200VAC type
Outer dimensions	Approx. 424 (width) × 220 (height) × 400 (depth) mm
Mass	16kg or less
Power draw	300VA or less

APPENDIX

Useful reference information for operating this apparatus is presented in this appendix.

A.1 The Relation of Data between each Function

Describes about the relation ship of the data between the functions.

A.1.1 The Relation ship of Data between Channels and Functions

Describes about the relation ship of the data between the channels and functions.

The sub-channel of channel 1 is channel 3, and the sub-channel of channel 2 is channel 4.

(1)   In the case of COUPLE CH ON

Function	Channel			
	CH1	CH3	CH2	CH4
MEAS	O	×	O	×
SUB MEAS	×	O	×	O
STIMULUS/RBW	Common			
Averaging	Common		Common	
Smoothing	Common		Common	
Trace operation	Independent	Independent	Independent	Independent
Parameter conversion	Independent	Independent	Independent	Independent
FORMAT	Independent	Independent	Independent	Independent
Scale	Independent	Independent	Independent	Independent
Marker	Independent	Independent	Independent	Independent
Limit line	Independent	Independent	Independent	Independent

Mark O shows that it can be set.
Mark × shows that it cannot be set.

(2)   In the case of COUPLE CH OFF

Function	Channel			
	CH1	CH3	CH2	CH4
MEAS	○	×	○	×
SUB MEAS	×	○	×	○
STIMULUS/RBW	Common		Common	
Averaging	Common		Common	
Smoothing	Common		Common	
Trace operation	Independent	Independent	Independent	Independent
Parameter conversion	Independent	Independent	Independent	Independent
FORMAT	Independent	Independent	Independent	Independent
Scale	Independent	Independent	Independent	Independent
Marker	Independent	Independent	Independent	Independent
Limit line	Independent	Independent	Independent	Independent

Mark ○ shows that it can be set.
Mark × shows that it cannot be set.

A.1.2   The Data Interlocking to each Item in MEAS Menu.

The data of the following functions are interlocked for each selected input port in the R3764/66H series.

Also the data of the scale function are interlocked for each FORMAT as well.

```
┌──────────┐
│   MEAS   │────────┬──── Calibration
└──────────┘        │
A/R                 │
B/R                 ├──── Electrical length,  Phase offset
REFLECTION          │
TRANSMISSION        │
S11                 └──── FORMAT ──── Scale
S12
  .              LOG MAG
  .              PHASE
                 DELAY
                 SMITH
                   .
                   .
```
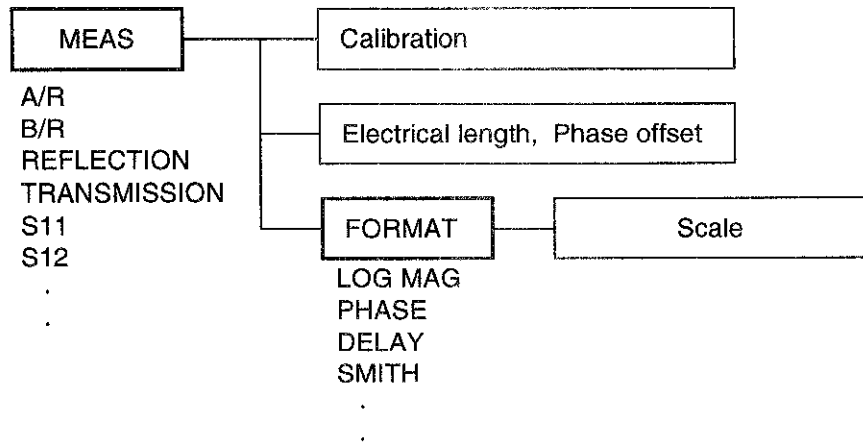
A.2 Measuring Time

The measurement time is obtained by adding the frequency setup time to the data acquisition time.
Data acquisition time is set up as SWEEP TIME.
Frequency setup time varies depending on the frequency setup.
The following shows the typical values.

(Example)
Start frequency   1GHz
Stop frequency   2GHz
Measuring point number   101 points

① Frequency between measuring points: 10MHz → Setup time, 100μsec/point

Total setup time is (100μsec/point) × 100 points = 10msec.

- When the frequency between the measuring points is more than 5MHz, the setup time is 100μsec per approximately 5MHz.

② Band switching time: approximately 8msec

- The R3764/66H series is composed of the following frequency bands.
  Each time the band is switched, the setup time is approximately 8msec.

Band	Frequency range
1	40MHz to 80MHz
2	80MHz to 160MHz
3	160MHz to 320MHz
4	320MHz to 560MHz
5	560MHz to 1120MHz
6	1120MHz to 2160MHz
7	2160MHz to 3800MHz
8	3800MHz to 6000MHz
9	6000MHz to 8000MHz

③ The setup time is the total of ① and ②, that is 18msec. Therefore, the measurement time is SWEEP TIME plus 18msec.

A.3 Initial Setting

Function	Initialize method	
	Power-on or preset	*RST
Stimulus		
Sweep type	Linear frequency sweep	Linear frequency sweep
Continuous sweep	ON	OFF
Trigger source	Internal (FREE RUN)	Internal (FREE RUN)
Trigger delay	OFF (0sec)	OFF (0sec)
Sweep time	190.95msec (AUTO) (R3764AH/BH/CH) 402.0msec (AUTO) (R3766AH/BH/CH)	240.2msec (AUTO) (R3764AH/BH/CH) 420.35msec (AUTO) (R3766AH/BH/CH)
Measurement point	201	1201
Start frequency	40MHz	40MHz
Stop frequency	3.8GHz (R3764AH/BH/CH) 8.0GHz (R3766AH/BH/CH)	3.8GHz (R3764AH/BH/CH) 8.0GHz (R3766AH/BH/CH)
Center frequency	1.92GHz (R3764AH/BH/CH) 4.02GHz (R3766AH/BH/CH)	1.92GHz (R3764AH/BH/CH) 4.02GHz (R3766AH/BH/CH)
Frequency span	3.76GHz (R3764AH/BH/CH) 7.96GHz (R3766AH/BH/CH)	3.76GHz (R3764AH/BH/CH) 7.96GHz (R3766AH/BH/CH)
Frequency display	Start/Stop	Start/Stop
Fixed frequency of level sweep	1GHz	1GHz
Output level	* 1	* 1
Start level	* 2	* 2
Stop level	* 2	* 2
Two-channel interlocking	ON	ON
Program sweep segment	All clear	All clear
Response		
Dual channel	OFF	OFF
Active channel	CH1	CH1
Resolution bandwidth	10kHz	10kHz
Selection item of input port	* 3	* 3
Average	OFF (Number of times 16)	OFF (Number of times 16)
Trace operation	NONE	NONE
Conversion	NONE	NONE
Characteristic impedance	50Ω	50Ω
Measurement format	* 4	* 4
Group delay aperture	10%	0.01%
Smoothing	OFF (Aperture 10%)	OFF (Aperture 0.01%)
Display	Data	Data
Split/Overlap	Overlap	Overlap
Label	NONE	NONE

Function	Initialize method	
	Power-on or preset	*RST
Reference value		
Logarithmic magnitude	0dB	0dB
Phase	0°	0°
Group delay	0sec	0sec
Smith chart	1	1
Polar coordinate	1	1
Linear amplitude	0	0
SWR	1	1
Real part	10	10
Imaginary part	10	10
Continuous phase	0°	0°
The valaue per division of Y-axis		
Logarithmic magnitude	* 5	* 5
Phase	45°	45°
Group delay	100nsec	100nsec
Smith chart	—	—
Polar coordinate	—	—
Linear amplitude	100m	100m
SWR	1	1
Real part	1	1
Imaginary part	1	1
Continuous phase	360°	360°
Reference position		
Logarithmic magnitude	* 6	* 6
Phase	50%	50%
Group delay	50%	50%
Smith chart	—	—
Polar coordinate	—	—
Linear amplitude	0%	0%
SWR	0%	0%
Real part	100%	100%
Imaginary part	100%	100%
Continuous phase	50%	50%
Calibration		
Correct measurement	OFF	OFF
Calibration data	Clear	Clear
Electrical length correction	OFF (0sec)	OFF (0sec)
Phase offset	OFF (0°)	OFF (0°)
Measurement end extension correction	OFF	OFF
R input	0 sec	0 sec
A input	0 sec	0 sec
B input	0 sec	0 sec
Port 1	0 sec	0 sec
Port 2	0 sec	0 sec
Velocity factor	1	1

A.3 Initial Setting

* 1: Output level

Type	Power-on or preset	*RST
AH	0dBm	0dBm
BH	0dBm	0dBm
CH AH + S parameter	10dBm	10dBm

* 2: Start/Stop level

Type	Power-on or preset		*RST	
	Start	Stop	Start	Stop
AH	-13dBm	0dBm	-13dBm	22dBm
BH	-15dBm	0dBm	-15dBm	20dBm
CH AH + S parameter	-20dBm	0dBm	-20dBm	10dBm

* 3: Selection item of input port

Type / Channel	CH1	CH2	CH3	CH4
AH	A/R	B/R	A/R	B/R
BH	REFLECTION	TRANSMISSION	REFLECTION	TRANSMISSION
CH AH + S parameter	S_{11}	S_{21}	S_{11}	S_{21}

* 4: Measurement format

Type / Channel	CH1	CH2	CH3	CH4
AH	LOG MAG	LOG MAG	LOG MAG	LOG MAG
BH	LOG MAG	LOG MAG	POLAR	LOG MAG
CH AH + S parameter	LOG MAG	LOG MAG	POLAR	LOG MAG

* 5: Logarithmic magnitude (the value per division of Y-axis)

Type Channel	CH1	CH2	CH3	CH4
AH	10dB	10dB	1dB	1dB
BH	5dB	10dB	1 UNIT	1dB
CH AH + S parameter	5dB	10dB	1 UNIT	1dB

* 6: Logarithmic magnitude (reference position)

Type Channel	CH1	CH2	CH3	CH4
AH	90%	90%	90%	90%
BH	90%	90%	—	90%
CH AH + S parameter	90%	90%	—	90%

A.3.1 Backup Memory Setting

Network analyzer GPIB address	11
System controller or addressable	Addressable
Printer GPIB address	12
Plotter GPIB address	5
Serial port setting	Baud rate : 9600
	Character length : 8 bits
	Plarity : None
	Stop bit length : 1 bit
Save register	All clear

A.4 Panel Emulation with Keyboard Connected

This equipment can emulate the R3764/66H front panel together with keyboard. In addition, the same screen as the R3764/66H is displayed to permit the user to operate in the R3764/66H mode.

The correspondence between the R3764/66H panel keys and the keyboard is as follows:

(1 of 2)

R3764/66H Panel Key	Keyboard
CH 1 key	Ctrl-1
CH 2 key	Ctrl-2
MEAS key	Ctrl-M
FORMAT key	Ctrl-F
SCALE key	Ctrl-S
DISPLAY key	Ctrl-D
AVG key	Ctrl-A
CAL key	Ctrl-C
MKR key	Ctrl-K
MKR → key	Ctrl-W
MENU key	Ctrl-N
START key	Ctrl-X
STOP key	Ctrl-Y
CENTER key	Ctrl-I
SPAN key	Ctrl-J

Note: "Ctrl-_ ○ " means that a_ ○ key is pressed while keeping the Ctrl key pressed.

R3764/66H Panel Key	Keyboard
SAVE key	Ctrl-V
RECALL key	Ctrl-R
COPY key	Ctrl-O
SYSTEM key	Ctrl-Z
PRESET key	Ctrl-Alt-Delete
PROGRAM key	Ctrl-G
LCL key	Ctrl-L
↑ key	↑
↓ key	↓
Data knob	Ctrl- ↑ or Ctrl- ↓
ENTRY OFF key	Delete
BS key	Back Space
GHz key	Ctrl-F9
MHz key	Ctrl-F10
kHz key	Ctrl-F11
×1 key	Enter
Soft keys K1 to K8	Function keys F1 to F8
Numerical Keys 0 to 9	Numerical keys 0 to 9

Note: "Ctrl-_ ○ " means that a_ ○ key is pressed while keeping the Ctrl key pressed.

⇧AIR FLOW

(33)

400

(69)

(20)

(9)

424

(10)

221

(13. 4)
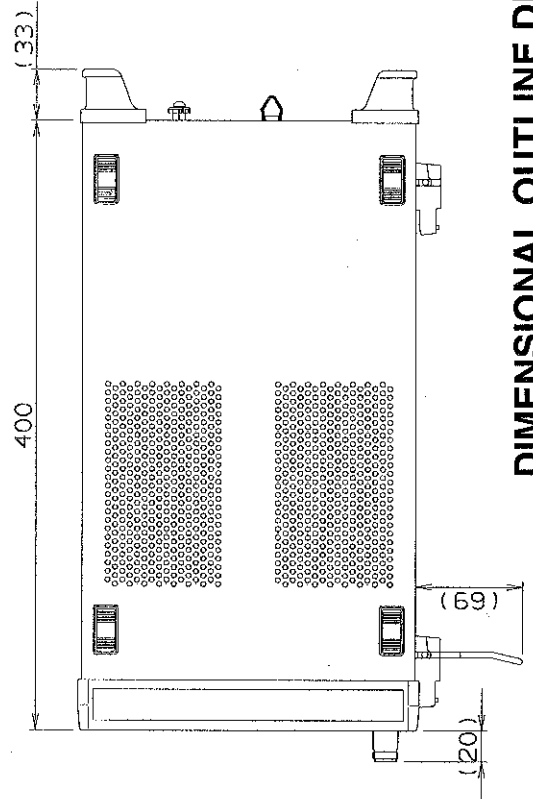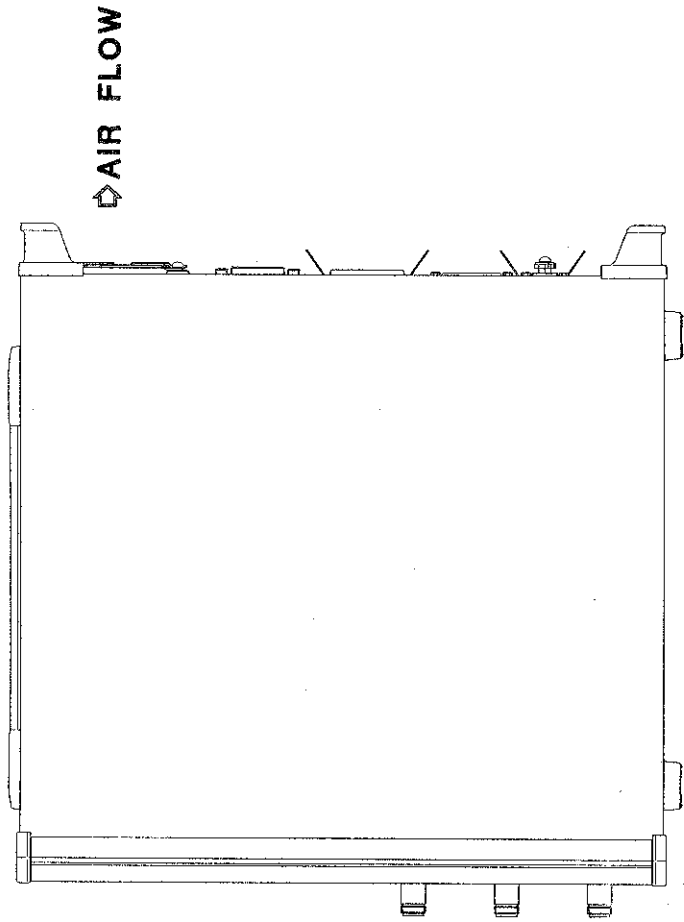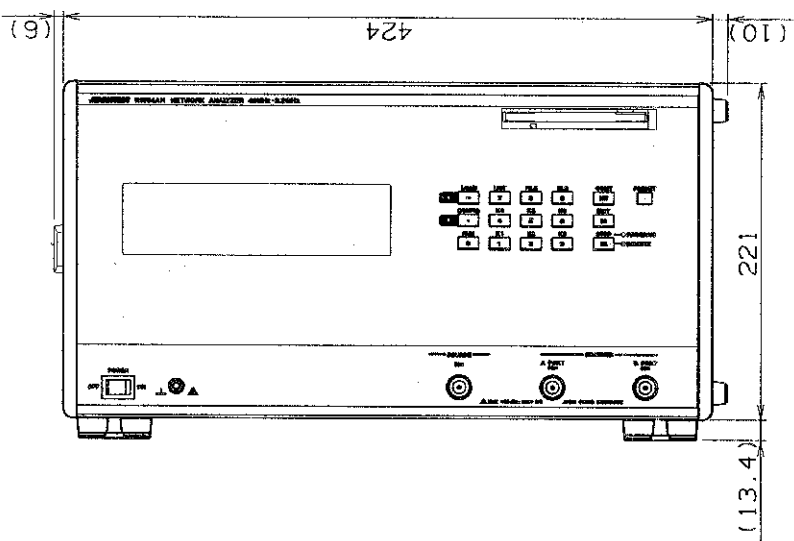
Unit : mm

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

ALPHABETICAL INDEX

IMPORTANT INFORMATION FOR ADVANTEST SOFTWARE

PLEASE READ CAREFULLY: This is an important notice for the software defined herein. Computer programs including any additions, modifications and updates thereof, operation manuals, and related materials provided by Advantest (hereafter referred to as "SOFTWARE"), included in or used with hardware produced by Advantest (hereafter referred to as "PRODUCTS").

SOFTWARE License

All rights in and to the SOFTWARE (including, but not limited to, copyright) shall be and remain vested in Advantest. Advantest hereby grants you a license to use the SOFTWARE only on or with Advantest PRODUCTS.

Restrictions

(1) You may not use the SOFTWARE for any purpose other than for the use of the PRODUCTS.

(2) You may not copy, modify, or change, all or any part of, the SOFTWARE without permission from Advantest.

(3) You may not reverse engineer, de-compile, or disassemble, all or any part of, the SOFTWARE.

Liability

Advantest shall have no liability (1) for any PRODUCT failures, which may arise out of any misuse (misuse is deemed to be use of the SOFTWARE for purposes other than it's intended use) of the SOFTWARE. (2) For any dispute between you and any third party for any reason whatsoever including, but not limited to, infringement of intellectual property rights.

LIMITED WARRANTY

1. Unless otherwise specifically agreed by Seller and Purchaser in writing, Advantest will warrant to the Purchaser that during the Warranty Period this Product (other than consumables included in the Product) will be free from defects in material and workmanship and shall conform to the specifications set forth in this Operation Manual.

2. The warranty period for the Product (the "Warranty Period") will be a period of one year commencing on the delivery date of the Product.

3. If the Product is found to be defective during the Warranty Period, Advantest will, at its option and in its sole and absolute discretion, either (a) repair the defective Product or part or component thereof or (b) replace the defective Product or part or component thereof, in either case at Advantest's sole cost and expense.

4. This limited warranty will not apply to defects or damage to the Product or any part or component thereof resulting from any of the following:

   (a) any modifications, maintenance or repairs other than modifications, maintenance or repairs (i) performed by Advantest or (ii) specifically recommended or authorized by Advantest and performed in accordance with Advantest 's instructions;

   (b) any improper or inadequate handling, carriage or storage of the Product by the Purchaser or any third party (other than Advantest or its agents);

   (c) use of the Product under operating conditions or environments different than those specified in the Operation Manual or recommended by Advantest, including, without limitation, (i) instances where the Product has been subjected to physical stress or electrical voltage exceeding the permissible range and (ii) instances where the corrosion of electrical circuits or other deterioration was accelerated by exposure to corrosive gases or dusty environments;

   (d) use of the Product in connection with software, interfaces, products or parts other than software, interfaces, products or parts supplied or recommended by Advantest;

   (e) incorporation in the Product of any parts or components (i) provided by Purchaser or (ii) provided by a third party at the request or direction of Purchaser or due to specifications or designs supplied by Purchaser (including, without limitation, any degradation in performance of such parts or components);

   (f) Advantest's incorporation or use of any specifications or designs supplied by Purchaser;

   (g) the occurrence of an event of force majeure, including, without limitation, fire, explosion, geological change, storm, flood, earthquake, tidal wave, lightning or act of war; or

   (h) any negligent act or omission of the Purchaser or any third party other than Advantest.

5. **EXCEPT TO THE EXTENT EXPRESSLY PROVIDED HEREIN, ADVANTEST HEREBY EXPRESSLY DISCLAIMS, AND THE PURCHASER HEREBY WAIVES, ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, (A) ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND (B) ANY WARRANTY OR REPRESENTATION AS TO THE VALIDITY, SCOPE, EFFECTIVENESS OR USEFULNESS OF ANY TECHNOLOGY OR ANY INVENTION.**

6. **THE REMEDY SET FORTH HEREIN SHALL BE THE SOLE AND EXCLUSIVE REMEDY OF THE PURCHASER FOR BREACH OF WARRANTY WITH RESPECT TO THE PRODUCT.**

7. **ADVANTEST WILL NOT HAVE ANY LIABILITY TO THE PURCHASER FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR REVENUES, IN ANY AND ALL CIRCUMSTANCES, EVEN IF ADVANTEST HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND WHETHER ARISING OUT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE. TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE.**

8. **OTHER THAN THE REMEDY FOR THE BREACH OF WARRANTY SET FORTH HEREIN, ADVANTEST SHALL NOT BE LIABLE FOR, AND HEREBY DISCLAIMS TO THE FULLEST EXTENT PERMITTED BY LAW ANY LIABILITY FOR, DAMAGES FOR PRODUCT FAILURE OR DEFECT, WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING, WITHOUT LIMITATION, NEGLEGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE.**

CUSTOMER SERVICE DESCRIPTION

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.

SALES & SUPPORT OFFICES

Advantest Korea Co., Ltd.
  22BF, Kyobo KangNam Tower,
  1303-22, Seocho-Dong, Seocho-Ku, Seoul #137-070, Korea
  Phone: +82-2-532-7071
  Fax: +82-2-532-7132

Advantest (Suzhou) Co., Ltd.
  Shanghai Branch Office:
  Bldg. 6D, NO.1188 Gumei Road, Shanghai, China 201102 P.R.C.
  Phone: +86-21-6485-2725
  Fax: +86-21-6485-2726

  Shanghai Branch Office:
  406/F, Ying Building, Quantum Plaza, No. 23 Zhi Chun Road,
  Hai Dian District, Beijing,
  China 100083
  Phone: +86-10-8235-3377
  Fax: +86-10-8235-6717

Advantest (Singapore) Pte. Ltd.
  438A Alexandra Road, #08-03/06
  Alexandra Technopark Singapore 119967
  Phone: +65-6274-3100
  Fax: +65-6274-4055

Advantest America, Inc.
  3201 Scott Boulevard, Suite, Santa Clara, CA 95054, U.S.A
  Phone: +1-408-988-7700
  Fax: +1-408-987-0691

ROHDE & SCHWARZ Europe GmbH
  Mühldorfstraße 15 D-81671 München, Germany
  (P.O.B. 80 14 60 D-81614 München, Germany)
  Phone: +49-89-4129-13711
  Fax: +49-89-4129-13723

ADVANTEST.

http://www.advantest.co.jp