ADVANTEST®

ADVANTEST CORPORATION

R3965/66 Series

3-Port Test Set

Operation Manual

MANUAL NUMBER FOE-8335015A01

Applicable models

R3965A
R3965B
R3966A
R3966B

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Printed in Japan

Safety Summary

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

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

- **Warning Labels**

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

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

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

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

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

- **Basic Precautions**

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

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

product.

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

- **Caution Symbols Used Within this Manual**

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

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

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

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

- **Safety Marks on the Product**

The following safety marks can be found on Advantest products.

 : ATTENTION - Refer to manual.

 : Protective ground (earth) terminal.

 : DANGER - High voltage.

 : CAUTION - Risk of electric shock.

- **Replacing Parts with Limited Life**

The following parts used in the instrument are main parts with limited life.
Replace the parts listed below before their expected lifespan has expired to maintain the performance and function of the instrument.
Note that the estimated lifespan for the parts listed below may be shortened by factors such as the environment where the instrument is stored or used, and how often the instrument is used.
The parts inside are not user-replaceable. For a part replacement, please contact the Advantest sales office for servicing.

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

Main Parts with Limited Life

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

- **Hard Disk Mounted Products**

The operational warnings are listed below.

- Do not move, shock and vibrate the product while the power is turned on.
  Reading or writing data in the hard disk unit is performed with the memory disk turning at a high speed. It is a very delicate process.

- Store and operate the products under the following environmental conditions.
  An area with no sudden temperature changes.
  An area away from shock or vibrations.
  An area free from moisture, dirt, or dust.
  An area away from magnets or an instrument which generates a magnetic field.

- Make back-ups of important data.
  The data stored in the disk may become damaged if the product is mishandled. The hard disc has a limited life span which depends on the operational conditions. Note that there is no guarantee for any loss of data.

- **Precautions when Disposing of this Instrument**

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

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

Example: fluorescent tubes, batteries

Environmental Conditions

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

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

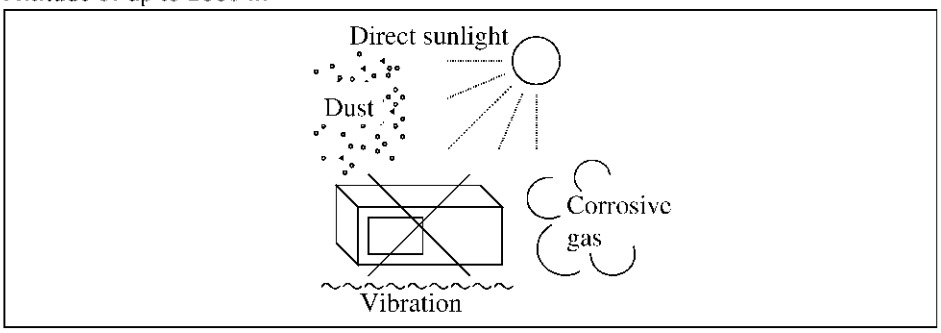


Figure-1 Environmental Conditions

- Operating position

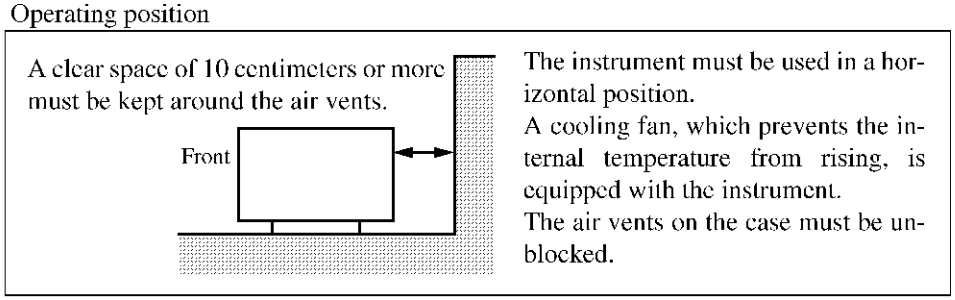


Figure-2 Operating Position

- Storage position

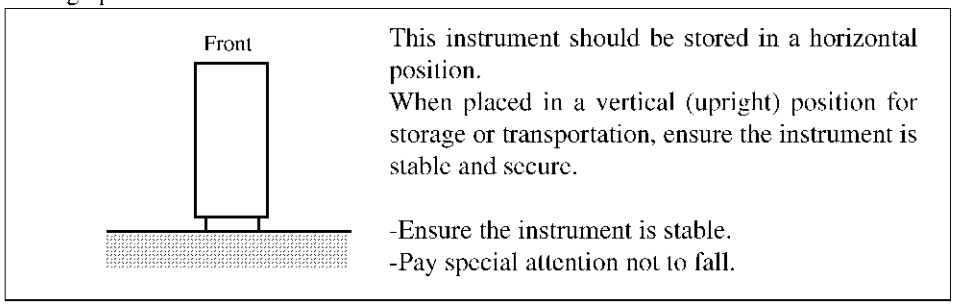


Figure-3 Storage Position

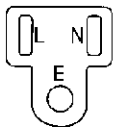
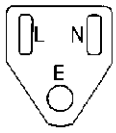
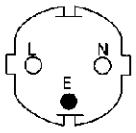
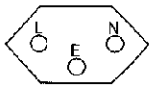
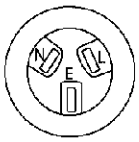
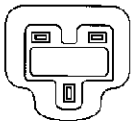
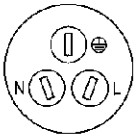
- The classification of the transient over-voltage, which exists typically in the main power supply, and the pollution degree is defined by IEC61010-1 and described below.

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

  Pollution Degree 2

Types of Power Cable

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

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

PREFACE

- This manual describes the following test sets and test adapters:
  3-port test set: The R3965A and R3965B
  3-port test adapter: The R3966A and R3966B
- The R3965A and R3965B can be connected to the R3765AH and R3767AH network analyzers.
- The R3966A and R3966B can be connected to the R3765CH and R3767CH network analyzers.

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1 OUTLINE

1.1 Products Overview

The R3965A and R3965B are three-port test sets which can be connected to the R3765AH and R3767AH network analyzers and used to measure transmission characteristics and reflection characteristics for three-port devices.
The test sets allow you to measure S parameters in three directions without changing the device connections .
The R3966A and R3966B are three-port test adapters which can be connected to the R3765CH and R3767CH network analyzers and used to measure transmission characteristics and reflection characteristics for three-port devices.
The test adapters can measure S parameters in three directions without the device connections being changed.
In this manual, the above test sets and test adapters are sometimes referred to as "the instrument".

1.2 R3965A/B and R3966A/B Precautions

(1) Turn the network analyzer power ON only after connecting the rear control cable between the instrument and the network analyzer.

(2) When turning the network analyzer on, make sure that the instrument is connected to the network analyzer. If not, the instrument can not be controlled from the network analyzer.

(3) If the instrument is connected to the network analyzer after its' power has been turned on, the network analyzer cannot control the instrument.

1.3 Attachments

When the instrument is delivered, make sure to check the following:

① Visually check to make sure there is no damage to the instrument.

② Make sure that the standard attachments listed in Table 1-1 and Table 1-2 are present.

If any of attachment is damaged or missing, contact an ADVANTEST customer engineering center or the nearest sales office.
Addresses and phone numbers are listed on the last page of this manual.

Note: ***Please refer to attachments by their stock number when ordering.***

Table 1-1 Standard Attachments for R3965A/B

Part name	Stock number	Quantity
N-N cable	A01247	3
Control cable used for A type	A01241	1
Control cable used for B type	A01281	1
N-SMA adapter used for B type	JCF-AA001PX16-5	6

Table 1-2 Standard Attachments for R3966A/B

Part name	Stock number	Quantity
N-N cable	A01247	2
Control cable used for A type	A01241	1
Control cable used for B type	A01281	1
N-SMA adapter used for B type	JCF-AA001PX16-5	5

1.4 Accessories

Table 1-3 Accessories

Part name	Type name	Remarks
N type 50Ω CAL kit	Model 9617A3	DC to 18GHz female & male
3.5mm CAL kit	Model 9617F3	DC to 18GHz female & male
Conversion adapter 50Ω	HRM-555S	N (male) to SMA (male)
Conversion adapter 50Ω	HRM-554S	N (male) to SMA (female)

2 PANEL DESCRIPTION

2.1 Front Panel Description

(1) R3965A/B

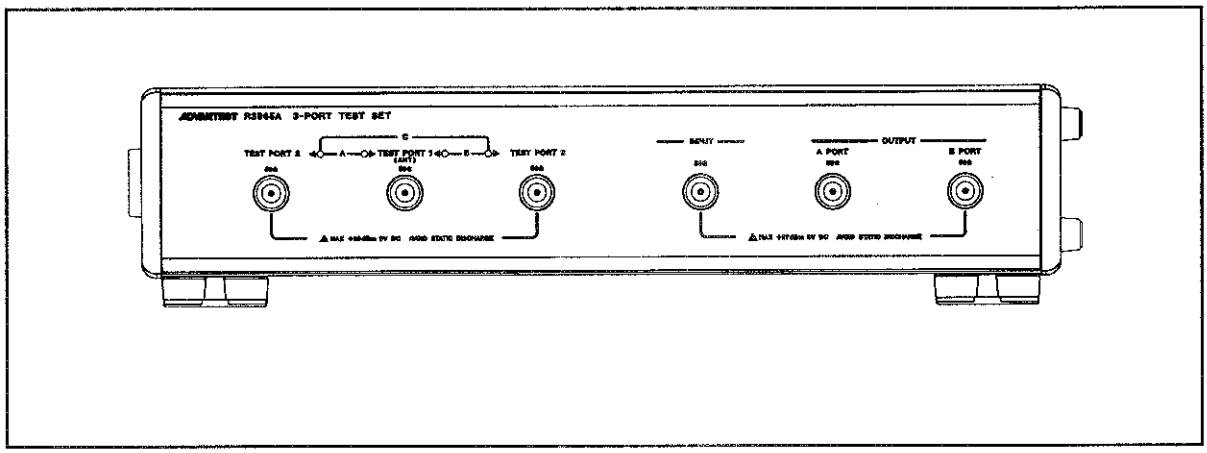


Figure 2-1 R3965A Front Panel

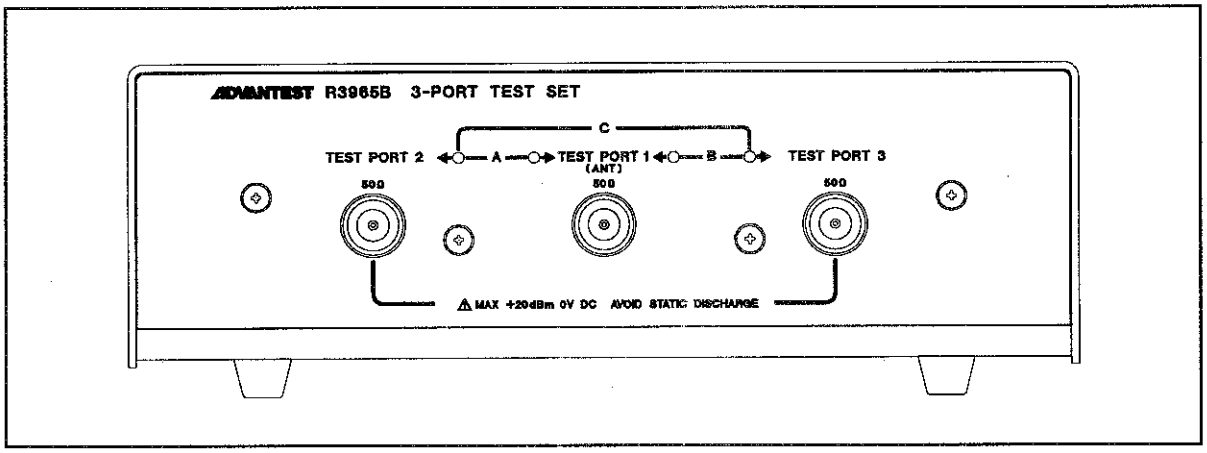


Figure 2-2 R3965B Front Panel

(2) R3966A/B

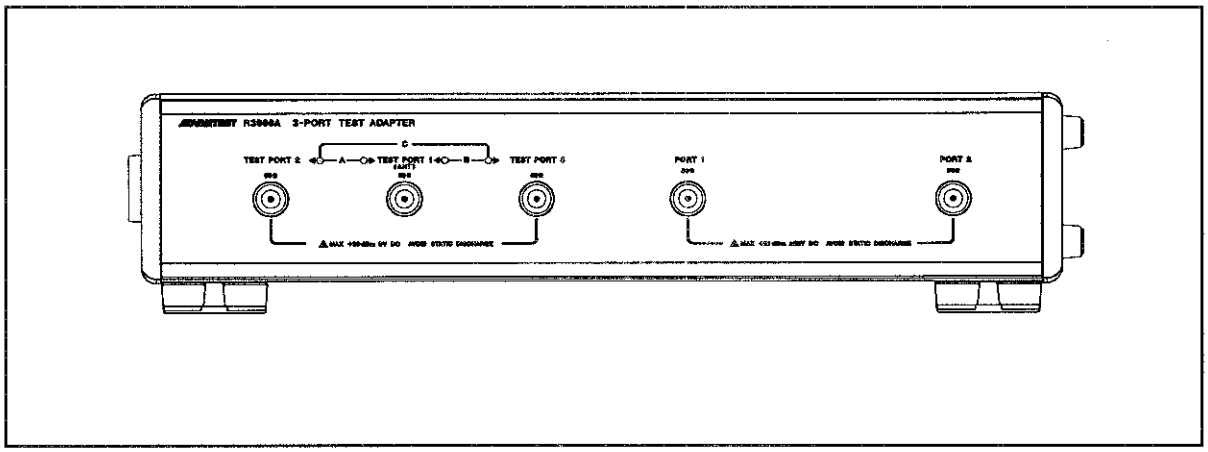


Figure 2-3 R3966A Front Panel

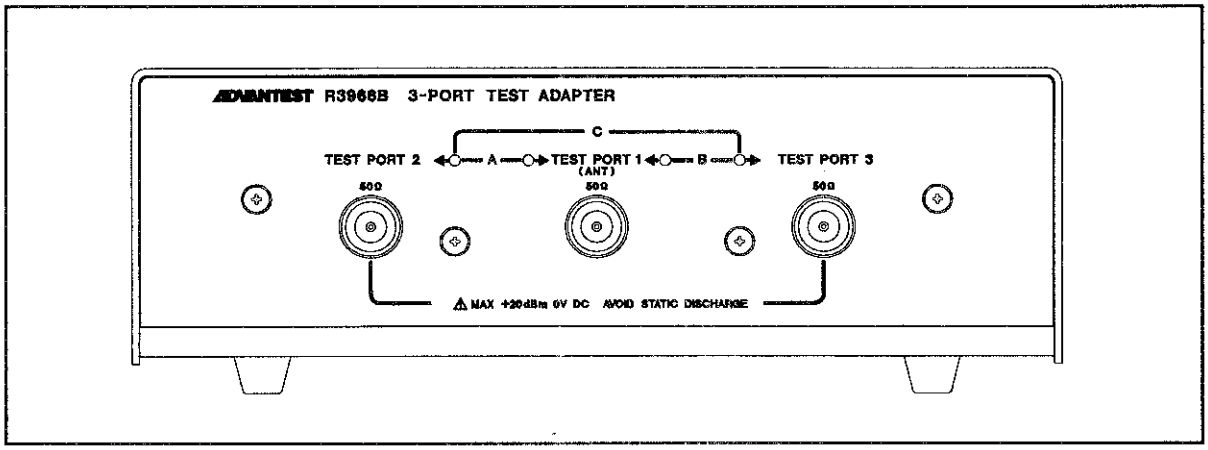


Figure 2-4 R3966B Front Panel

2.2 Rear Panel Description

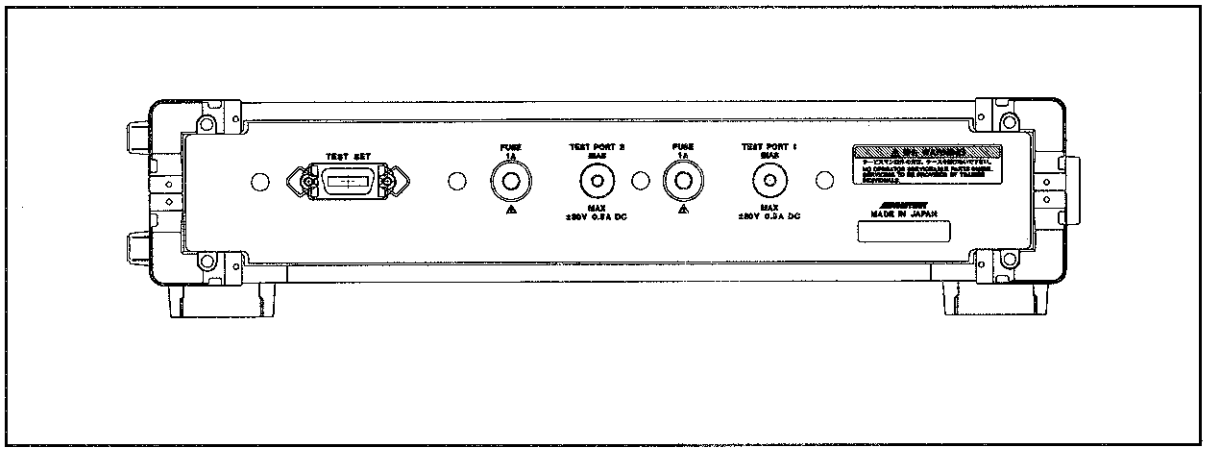


Figure 2-5 A Type Rear Panel

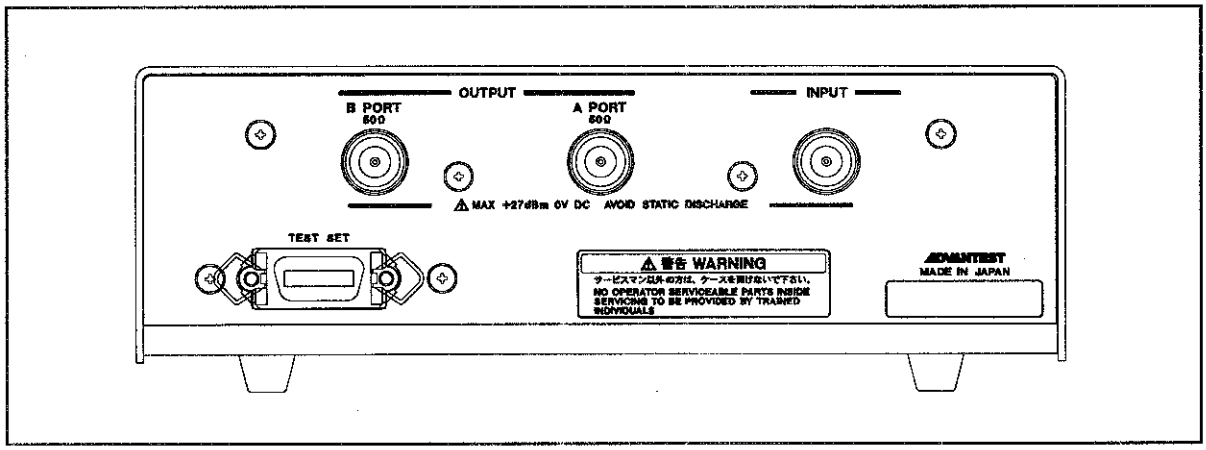


Figure 2-6 R3965B Rear Panel

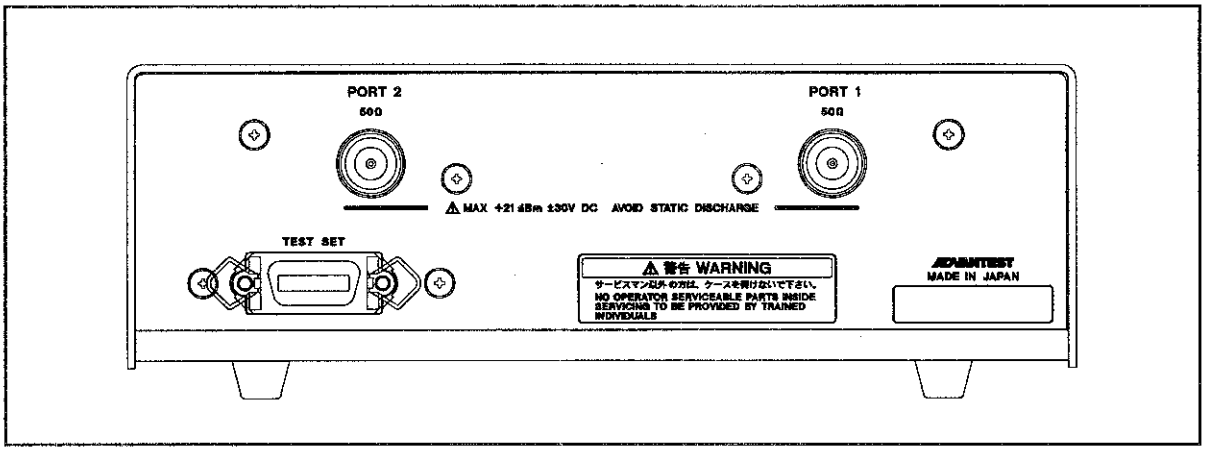


Figure 2-7 R3966B Rear Panel

3 CONNECTING THE R3965/66 TO A NETWORK ANALYZER

The R3965A and R3965B can be connected to the R3765AH or R3767AH.
The R3966A and R3966B can be connected to the R3765CH or R3767CH.

3.1 RF Cable Connection

(1) R3965A/B

Connect the instrument to the network analyzer using the attached N-N cables as shown below:

R3965A/B	R3765AH/R3767AH	Cable used
INPUT	SOURCE	A01247
A PORT	A PORT	A01247
B PORT	B PORT	A01247

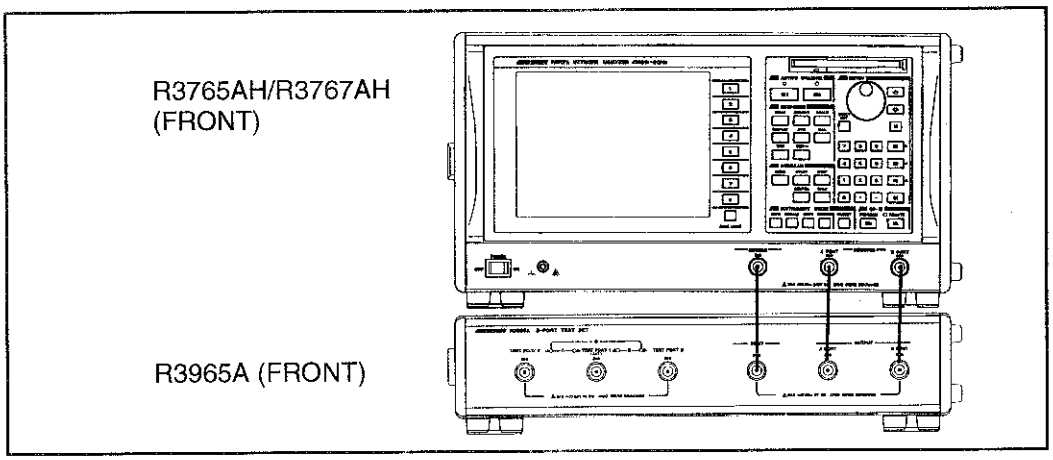


Figure 3-1 R3965A Connection

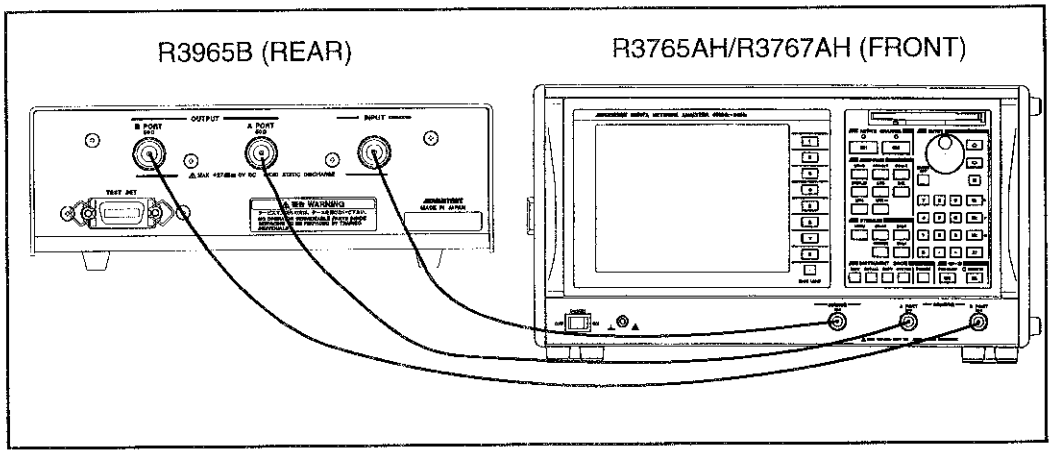


Figure 3-2 R3965B Connection

(2) R3966A/B

Connect the instrument to the network analyzer using the attached N-N cables as shown below:

R3966A/B	R3765CH/R3767CH	Cable used
PORT1	TEST PORT1	A01247
PORT2	TEST PORT2	A01247

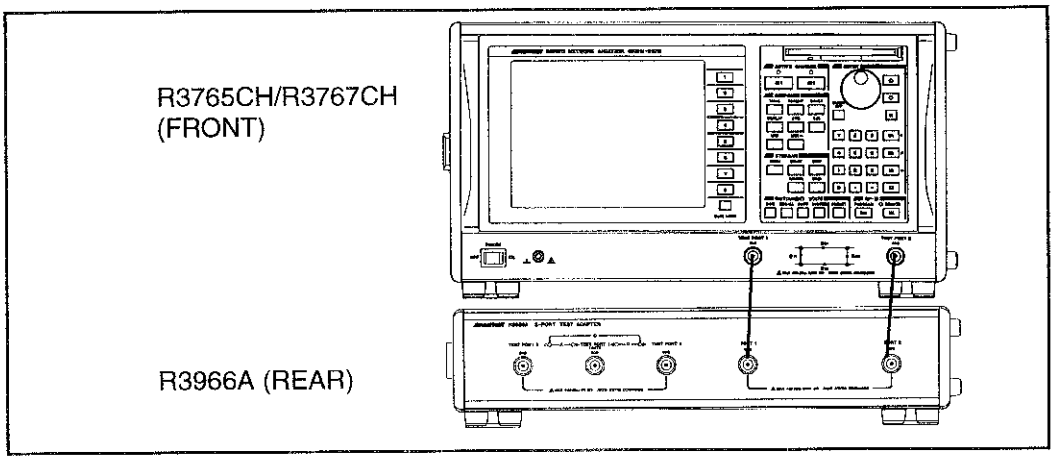


Figure 3-3 R3966A Connection

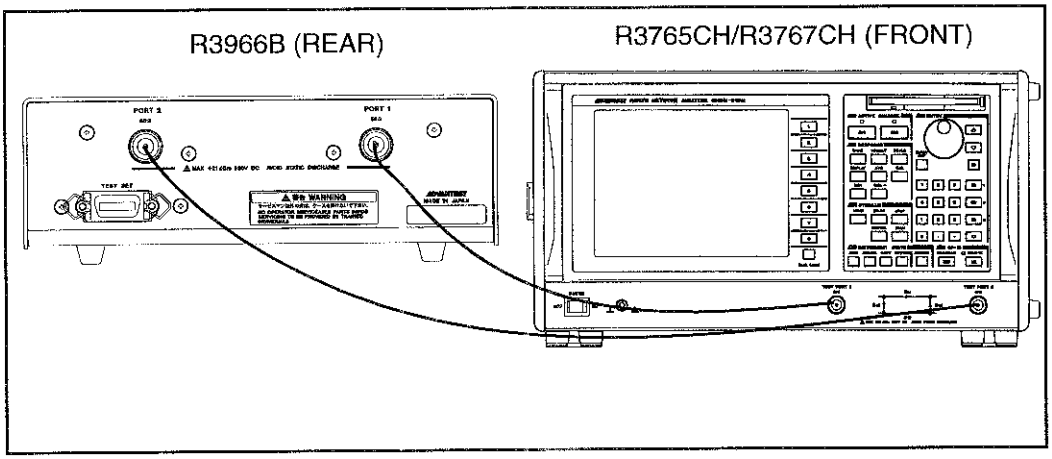


Figure 3-4 R3966B Connection

3.2 Control Cable Connection

(1) R3965A/R3966A

Connect the instrument to the network analyzer using the attached control cable (A01241) as shown below:

R3965A/R3966A	R3765AH/CH, R3767AH/CH
TEST SET ●——————●	TEST SET

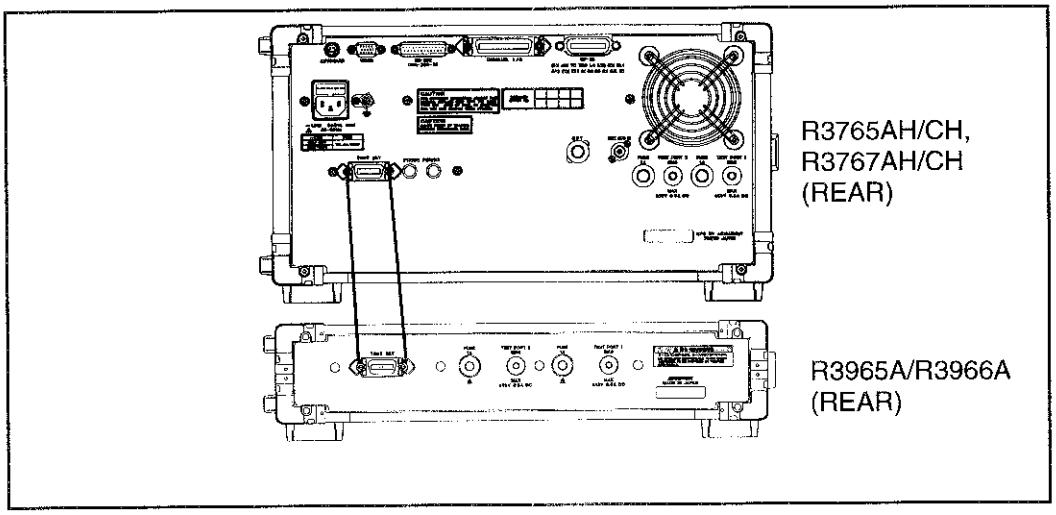


Figure 3-5 A Type Connection

(2) R3965B/R3966B

Connect the instrument to the network analyzer using the attached cable (A01281) as shown below:

R3965B/R3966B	R3765AH/CH, R3767AH/CH
TEST SET ●——————●	TEST SET

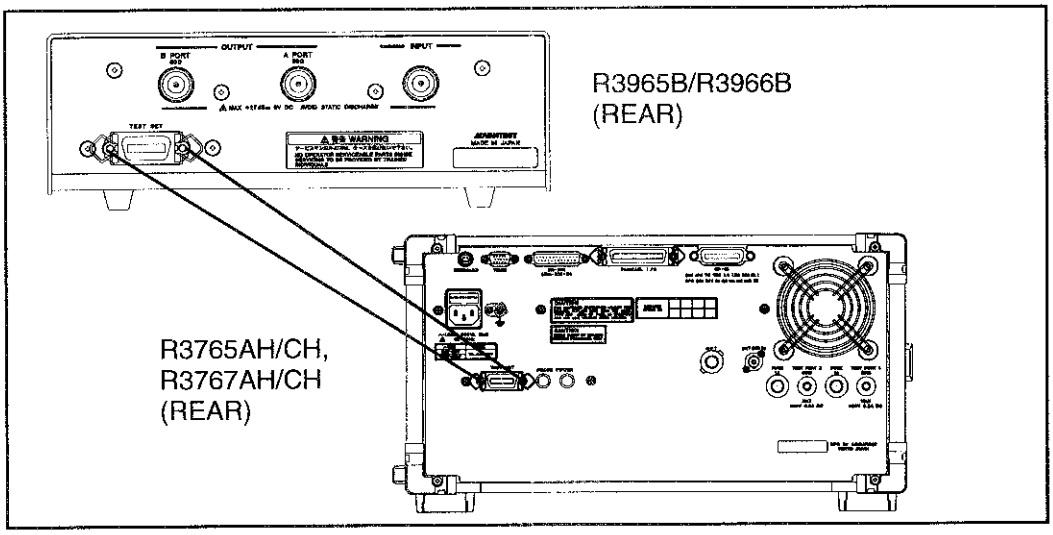


Figure 3-6 B Type Connection

4 BASIC MEASUREMENTS

4.1 Measurement Overview

CAUTION!
Use the 50 Ω-system CAL kit and connecting cables for the instrument being used.
When calibrating the instrument, set the CAL kit type and FEMAL/MAL (polarity) according to connector terminals used before performing measurements.

Select the S parameter to be measured using the **MEAS** key.

S11 :	Reflection characteristics for TEST PORT1
S22 :	Reflection characteristics for TEST PORT2
S33 :	Reflection characteristics for TEST PORT3
S21 :	Transmission characteristics from TEST PORT1 to TEST PORT2
S23 :	Transmission characteristics from TEST PORT3 to TEST PORT2
S12 :	Transmission characteristics from TEST PORT2 to TEST PORT1
S13 :	Transmission characteristics from TEST PORT3 to TEST PORT1
S31 :	Transmission characteristics from TEST PORT1 to TEST PORT3
S32 :	Transmission characteristics from TEST PORT2 to TEST PORT3

4.2 Calibration (TRIPLEX 2PORT CAL)

A procedure for performing a TRIPLEX 2PORT CAL and measuring devices using the R3965A or R3965B three-port test set is shown below:
The triplex two-port calibration has the same procedure as the three-port calibration.

CAUTION!

1. ***When a calibration has already been performed, clear the previous calibration data by selecting CLEAR CAL DATA and then start the new calibration.***
2. ***The calibration is completed when the "Wait for Sweep" massage is turned off.***
3. ***While this message is displayed, do not move the instrument, connecting cables, or connectors.***

① Invoke the TRIPLEX 2PORT CAL menu as shown below:
CAL, ***CAL MEAS***, ***TRIPLEX 2PORT CAL***

② Invoke the PORT1 REFLECTION menu from the TRIPLEX 2PORT Reflection Calibration.
PORT1 REFLECT'N

③ Connect the open standard to the TEST PORT1 to obtain the calibration data.
S11(PORT1) OPEN

The screen displayed after the calibration data has been obtained is shown in Figure 4-1.

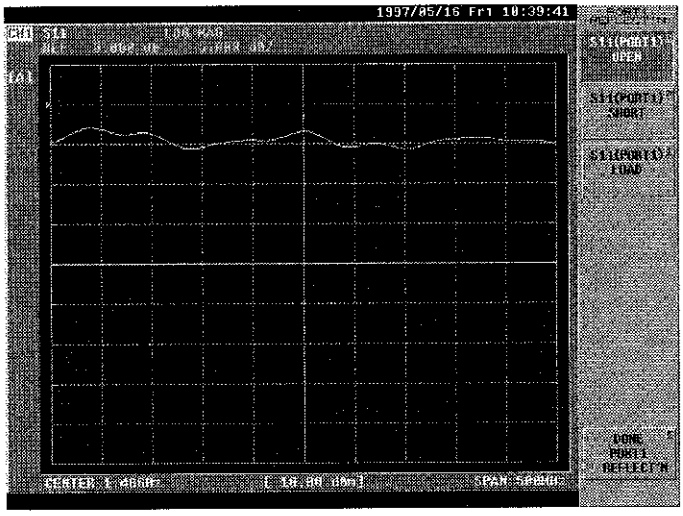


Figure 4-1 PORT1 Reflection Calibration Using the Open Standard

④ Connect the short standard to TEST PORT1 to obtain the calibration data.
S11(PORT1) SHORT

The screen displayed after the calibration data has been obtained is shown in Figure 4-2.

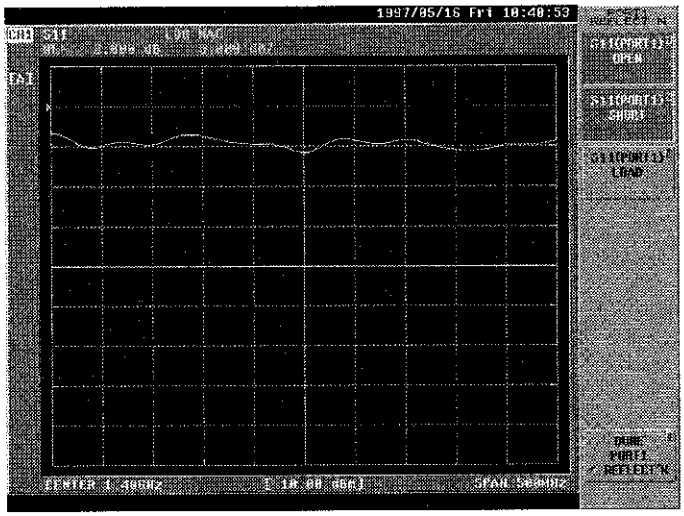


Figure 4-2 PORT1 Reflection Calibration Using the Short Standard

⑤ Connect the load standard to TEST PORT1 to obtain the calibration data.
S11(PORT1) LOAD

The screen displayed after the calibration data has been obtained is shown in Figure 4-3.

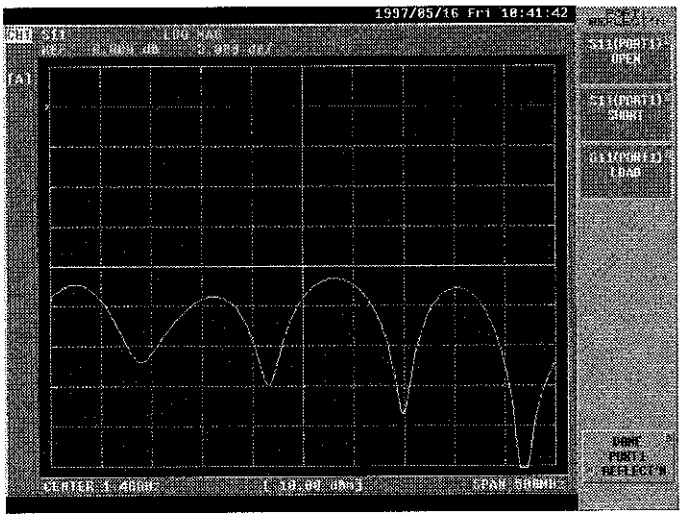


Figure 4-3 PORT1 Reflection Calibration Using the Load Standard

⑥ Perform the TEST PORT1 reflection calibration.
DONE PORT1 REFLECT'N
(It is possible to obtain the calibration data again for each calibration standard if this key is not pressed.)

The screen returns to the TRIPLEX 2PORT CAL menu when the TEST PORT1 reflection calibration is completed.

When the key is pressed, the screen is displayed as shown in Figure 4-4.

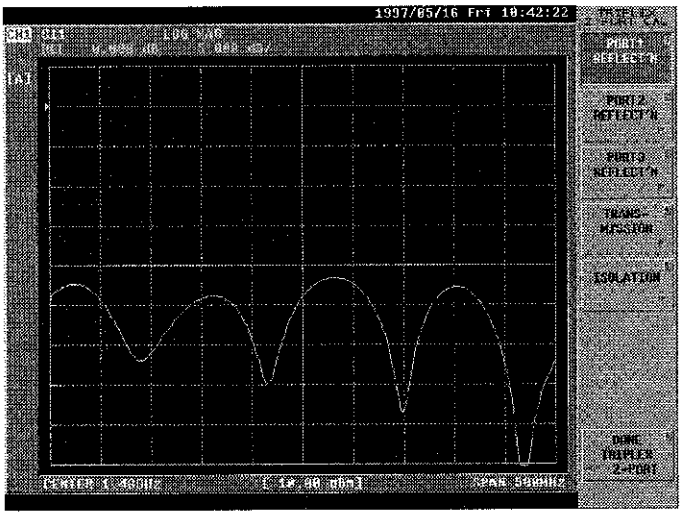


Figure 4-4 TRIPLEX 2PORT (PORT1) Reflection Calibration

⑦ Calibrate TEST PORT2 and TEST PORT3 in the same way as TEST PORT1 Step ⑧ to step ⑲ shown below list how to do this:

⑧ Invoke the PORT2 REFLECTION menu from the TRIPLEX 2PORT Reflection Calibration.
PORT2 REFLECT'N

⑨ Connect the open standard to TEST PORT2 to obtain the calibration data.
S22(PORT2) OPEN

⑩ Connect the short standard to TEST PORT2 to obtain the calibration data.
S22(PORT2) SHORT

⑪ Connect the load standard to TEST PORT2 to obtain the calibration data.
S22(PORT2) LOAD

⑫ Execute the TEST PORT2 reflection calibration.
DONE PORT2 REFLECT'N
(It is possible to obtain the calibration data again for each calibration standard if this key is not pressed.)

⑬ The screen returns to the TRIPLEX 2PORT CAL menu when the TEST PORT2 reflection calibration is completed.

⑭ Invoke the PORT3 REFLECTION menu from the TRIPLEX 2PORT Reflection Calibration.
PORT3 REFLECTION

⑮ Connect the open standard to TEST PORT3 to obtain the calibration data.
S33(PORT3) OPEN

⑯ Connect the short standard to TEST PORT3 to obtain the calibration data.
S33(PORT3) SHORT

⑰ Connect the load standard to TEST PORT3 to obtain the calibration data.
S33(PORT3) LOAD

⑱ Execute the TEST PORT3 reflection calibration.
DONE PORT3 REFLECTION
(It is possible to obtain the calibration data again for each calibration standard if this key is not pressed.)

⑲ The screen returns to the TRIPLEX 2PORT CAL menu when the TEST PORT3 reflection calibration is completed.

⑳ Invoke the TRANS MISSION menu from the TRIPLEX 2PORT Transmission Calibration.
TRANS MISSION

㉑ Perform the transmission calibration between TEST PORT1 and TEST PORT2.
Connect the thru standard between TEST PORT1 and TEST PORT2.
A(P1-P2) THRU

The screen displayed after the calibration data has been obtained is shown in Figure 4-5.

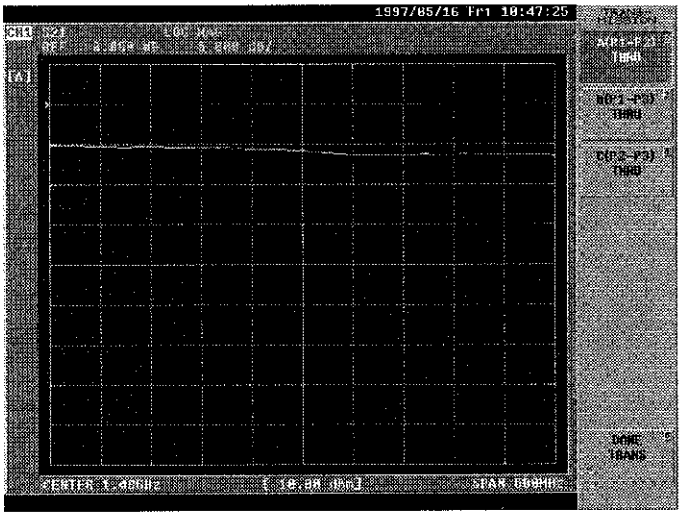


Figure 4-5 TRIPLEX 2PORT (PORT1 to PORT2) Transmission Characteristics

㉒ Perform the transmission calibration between TEST PORT1 and TEST PORT3.
Connect the thru standard between TEST PORT1 and TEST PORT3.
B(P1-P3) THRU

㉓ Perform the transmission calibration between TEST PORT2 and TEST PORT3.
Connect the thru standard between TEST PORT2 and TEST PORT3.
C(P2-P3) THRU

㉔ Execute the transmission calibration.
DONE TRANS
(It is possible to obtain the calibration data again for each calibration standard if this key is not pressed.)

The screen returns to the TRIPLEX 2PORT CAL menu when the transmission calibration is completed.

The screen displayed after the calibration data has been obtained is shown in Figure 4-6.

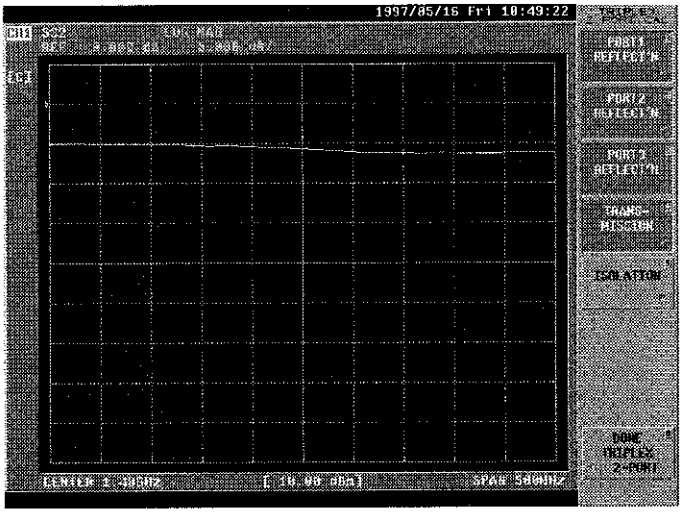


Figure 4-6 TRIPLEX 2PORT Transmission Calibration

㉕ Invoke the TRIPLEX 2PORT ISOLATION menu.
ISOLATION

㉖ When you do not want to perform an isolation calibration, press the following key:
OMIT ISOLATION

㉗ To perform an isolation calibration, do the following:
Connect the load standards to TEST PORT1 and TEST PORT2 to obtain the calibration data.
A(P1-P2) ISOLATION

The screen displayed after the calibration data has been obtained is shown in Figure 4-7.

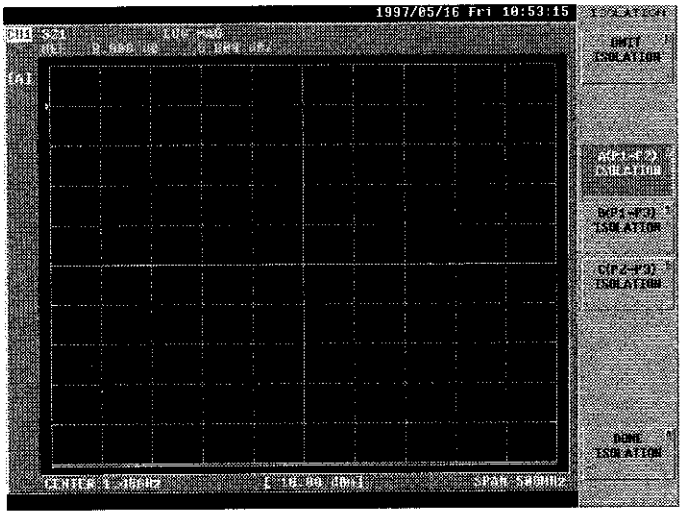


Figure 4-7 TRIPLEX 2PORT (PORT1 to PORT2) Isolation Calibration

㉘ onnect the load standards to TEST PORT1 and TEST PORT3 and obtain the calibration data.
B(P1-P3) ISOLATION

㉙ Connect the load standards to TEST PORT2 and TEST PORT3 and obtain the calibration data.
C(P2-P3) ISOLATION

㉚ Execute the ISOLATION calibration.
DONE ISOLATION
(It is possible to obtain the calibration data again for each calibration standard if this key is not pressed.)

The screen displayed after the calibration data has been obtained is shown in Figure 4-8.

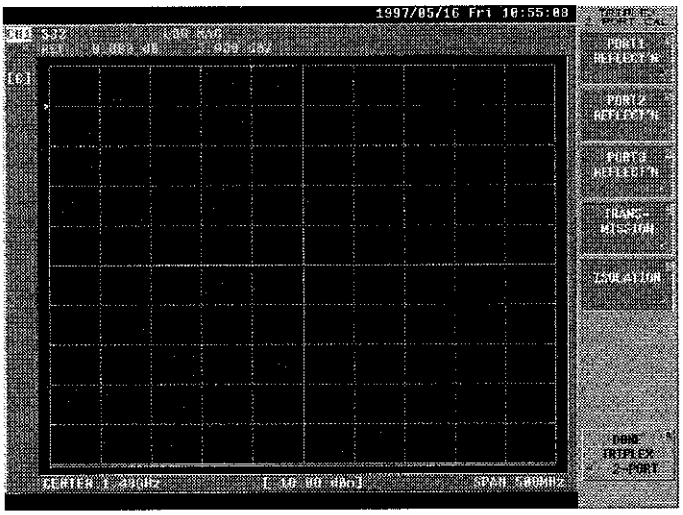


Figure 4-8 TRIPLEX 2PORT Isolation Calibration

㉛ Execute the TRIPLEX 2PORT CAL.
DONE TRIPLEX 2-PORT

The screen is displayed as shown in Figure 4-9.

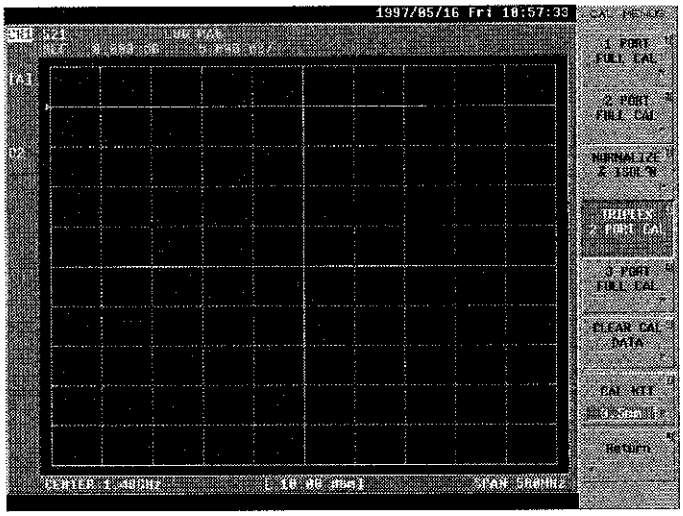


Figure 4-9 TRIPLEX 2PORT Calibration

The TRIPLEX 2PORT CAL is now finished.

4.3 Measurement Examples

This section describes a method of measuring transmission characteristics using simultaneous display of channel 1 and channel 3(using SUB MEAS).
A 1.48 GHz circulator is used as an example.

① Perform a setup and preset referring to Figure 4-10 and section 4.4.1 of the Network Analyzer Operation Manual.

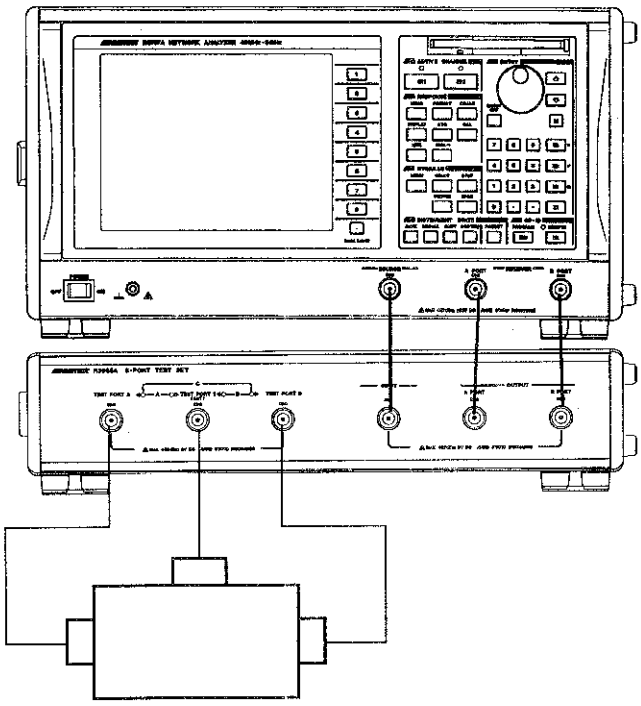


Figure 4-10 Setup Diagram

② To measure transmission characteristics between TEST PORT1 and TEST PORT2, set the network analyzer as shown below.

Block name	Setting contents	Key operation
ACTIVE CHANNEL	Set to channel 1.	**CH1**
RESPONSE	Select the receiving section input port.	**MEAS, *TEST PORT CONNECTION A(P1-P2)*** **MEAS, *S21[A] TRANS FWD (P1→P2)*** **MEAS, *SUB MEAS (ON)***
	Set the log magnitude format	**FORMAT, *LOGMAG***
	Set to 5/DIV	**SCALE, *5/DIV***
	Select the receiving section input port.	**MEAS, *S12[A] TRANS REV (P1←P2)***
STIMULUS	Set the center frequency to 1.48GHz. Set the span frequency to 500MHz.	**CENTER, 1, ·, 4, 8, GHz** **SPAN, 5, 0, 0, MHz**

③ Perform the calibration (TRIPLEX CAL).
(see section 4.2 Calibration)

④ The screen when TEST PORT CONNECTION A(P1-P2) is executed is displayed as shown in Figure 4-11.
CH1 shows S21 measurement data and CH3 (SUB MEAS) shows S12 measurement data.

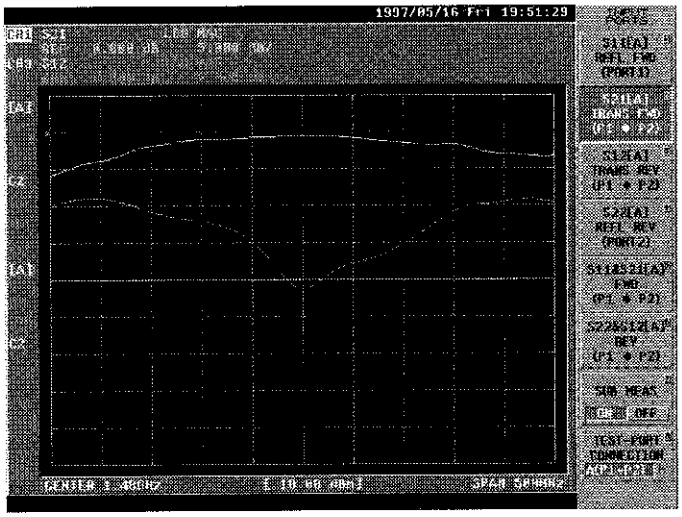


Figure 4-11 Transmission Characteristics between TEST PORT1 and TEST PORT2

⑤ To measure transmission characteristics between TEST PORT1 and TEST PORT3, set the network analyzer as shown below.

Block name	Setting contents	Key operation
ACTIVE CHANNEL	Set to channel 1.	**CH1**
RESPONSE	Select the receiving section input port.	**MEAS**, ***TEST PORT CONNECTION B(P1-P3)*** **MEAS**, ***S31[B] TRANS FWD (P1→P3)*** **MEAS**, ***SUB MEAS (ON)***
	Set the log magnitude format	**FORMAT**, ***LOGMAG***
	Set the scale to 5/DIV.	**SCALE**, ***5/DIV***
	Select the receiving section input port.	**MEAS**, ***S13[B] TRANS REV (P1←P3)***

⑥ TEST PORT CONNECTION B(P1-P3) is displayed as shown in Figure 4-12. The CH1 shows S31 measurement data and the CH3 (SUB MEAS) shows S13 measurement data.

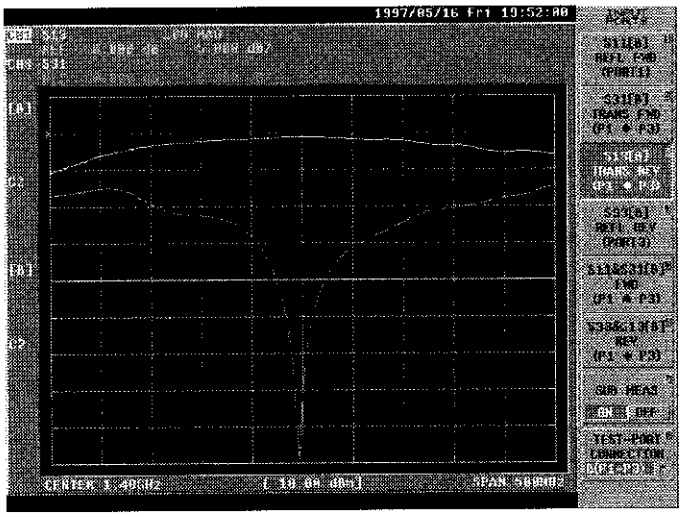


Figure 4-12 Transmission Characteristics between TEST PORT1 and TEST PORT3

⑦ To measure transmission characteristics between TEST PORT2 and TEST PORT3, set the network analyzer as shown below.

Block name	Setting contents	Key operation
ACTIVE CHANNEL	Set to channel 1.	**CH1**
RESPONSE	Select the receiving section input port.	**MEAS**, ***TEST PORT CONNECTION C(P2-P3)*** **MEAS**, ***S32[C] TRANS FWD (P2→P3)*** **MEAS**, ***SUB MEAS (ON)***
	Set the log magnitude format	**FORMAT**, ***LOGMAG***
	Set the scale to 5/DIV.	**SCALE**, ***5/DIV***
	Select the receiving section input port.	**MEAS**, ***S23[C] TRANS REV (P2←P3)***

⑧ TEST PORT CONNECTION C(P2-P3) is displayed as shown in Figure 4-13. CH1 shows S32 measurement data and CH3 (SUB MEAS) shows S23 measurement data.

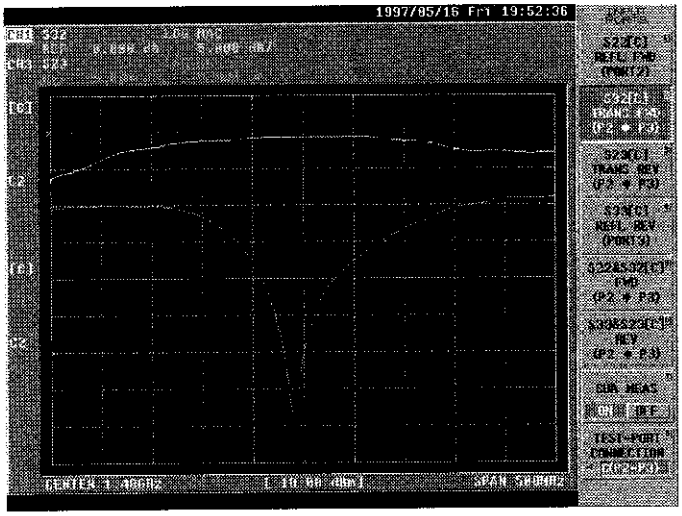


Figure 4-13 Transmission Characteristics between TEST PORT2 and TEST PORT3

5 OPERATION DESCRIPTION

5.1 Operation of R3965A/B

(1). Reflection characteristics

① When TEST-PORT CONNECTION [A(P1-P2)],S11[A] is set:

The signal from <INPUT> is passed through J0 and J2 of the SW4, and the IN and TEST of the Directional Bridge 2, and then output to <TEST PORT1>.
Reflected components from <TEST PORT1> are passed through TEST and OUT of Directional Bridge 2, and J2 and J0 of the SW 2, and then output to <A PORT>.

② When TEST-PORT CONNECTION [A(P1-P2)],S22[A] is set:

The signal from <INPUT> is passed through J0 and J1 of the SW4, J0 and J1 of the SW5, and the IN and TEST of the Directional Bridge 3, and then output to <TEST PORT2>.
Reflected components from <TEST PORT2> are passed through TEST and OUT of Directional Bridge 3, and J0 and J1 of SW 3, the J1 and J0 of the SW1, and then output to <B PORT>.

③ When TEST-PORT CONNECTION [B(P1-P3)],S11[B] is set:

The input signal and reflected components are passed through in the same way as case ① above .

④ When TEST-PORT CONNECTION [B(P1-P3)],S33[B] is set:

The signal from the <INPUT> is passed through J0 and J1 of the SW4, and the J0 and J2 of the SW5, to the IN and TEST of Directional Bridge 1, and then output to <TEST PORT3>.
Reflected components from <TEST PORT 3> are passed through TEST and OUT of the Directional Bridge 1, to the J2 and J0 of the SW 1, and then output to the <B PORT>.

⑤ When TEST-PORT CONNECTION [C(P2-P3)],S22[C] is set:

The signal from <INPUT> is passed through J0 and J1 of the SW4, and J0 and J1 of the SW 5, to the IN and TEST of the Directional Bridge 3, and then output to the <TEST PORT2>.
Reflected components from <TEST PORT2> are passed through TEST and OUT of the Directional Bridge 3, the J0 and J2 of the SW 3, and the J1 and J0 of the SW2, and then output to the <A PORT>.

⑥ When TEST-PORT CONNECTION [C(P2-P3)], S33[C] is set:

The input signal and reflected components are passed through in the same way as case ④ above.

⑦ The network analyzer compares and measures the <INPUT> signal to the <A PORT> signal or <B PORT> signal, and displays the results.

(2) Transmission characteristics

① When TEST-PORT CONNECTION [A(P1-P2)],S11[A] is set:

The signal from the <INPUT> is passed through J0 to J2 of SW4, and the IN and TEST of the Directional Bridge 2, and output to <TEST PORT1>. Then, the signal is passed through the device between <TEST PORT1> and <TEST PORT2> and input into <TEST PORT2>.
The signal input into <TEST PORT2> is passed through TEST and OUT of Directional Bridge 3, J0 and J1 of SW3, J1 and J0 of SW1, and then output to <B PORT>.

② When TEST-PORT CONNECTION [A(P1-P2)],S12[A] is set:

The signal from the <INPUT> is passed through J0 and J1 of SW4, J0 and J1 of SW5, and the IN and TEST of Directional Bridge 3, and output to <TEST PORT2>. Then, the signal is passed through the device between <TEST PORT2> and <TEST PORT1> and input into <TEST PORT1>.
The signal input into <TEST PORT1> is passed through TEST and OUT of Directional Bridge 2, the J2 and J0 of SW2, and output to <A PORT>.

③ When TEST-PORT CONNECTION [B(P1-P3)],S31[B] is set:

The signal from the <INPUT> is passed through J0 and J2 of the SW4, the IN and TEST of Directional Bridge 2, and output to <TEST PORT1>. Then, the signal is passed through the device between <TEST PORT1> and <TEST PORT3> and input into <TEST PORT3>.
The signal input into <TEST PORT3> is passed through TEST and OUT of Directional Bridge 1, J2 and J0 of the SW1, and output to the <B PORT>.

④ When TEST-PORT CONNECTION [B(P1-P3)],S13[B] is set:

The signal from <INPUT> is passed through J0 and J1 of SW4, J0 and J2 of SW5, the IN and TEST of Directional Bridge 1, and output to <TEST PORT3>. Then, the signal is passed through the device between <TEST PORT3> and <TEST PORT1> and input into <TEST PORT1>.
The signal input into <TEST PORT1> is passed through TEST and OUT of Directional Bridge 2, J2 and J0 of SW2, and output to <A PORT>.

⑤ When TEST-PORT CONNECTION [C(P2-P3)],S32[C] is set:

The signal from <INPUT> is passed through J0 and J1 of the SW4, J0 and J1 of SW5, the IN and TEST of Directional Bridge 3, and output to <TEST PORT2>. Then, the signal is passed through the device between <TEST PORT2> and <TEST PORT3> and input to <TEST PORT3>.
The signal input into <TEST PORT3> is passed through between the TEST and OUT of Directional Bridge 1, J2 and J0 of SW1, and output to <B PORT>.

⑥ When TEST-PORT CONNECTION [C(P2-P3)],S23[C] is set:

The signal from <INPUT> is passed through J0 and J1 of SW4, J0 and J2 of SW5, the IN and TEST of Directional Bridge 1, and output to <TEST PORT3>. Then, the signal is passed through the device between <TEST PORT3> and <TEST PORT2> and input to <TEST PORT2>.
The signal input into <TEST PORT2> is passed through TEST and OUT of Directional Bridge 3, J0 and J2 of SW3, J1 and J0 of SW2, and output to <A PORT>.

⑦ The network analyzer compares and measures the <INPUT> signal to the <A PORT> signal or <B PORT> signal, and displays the results.

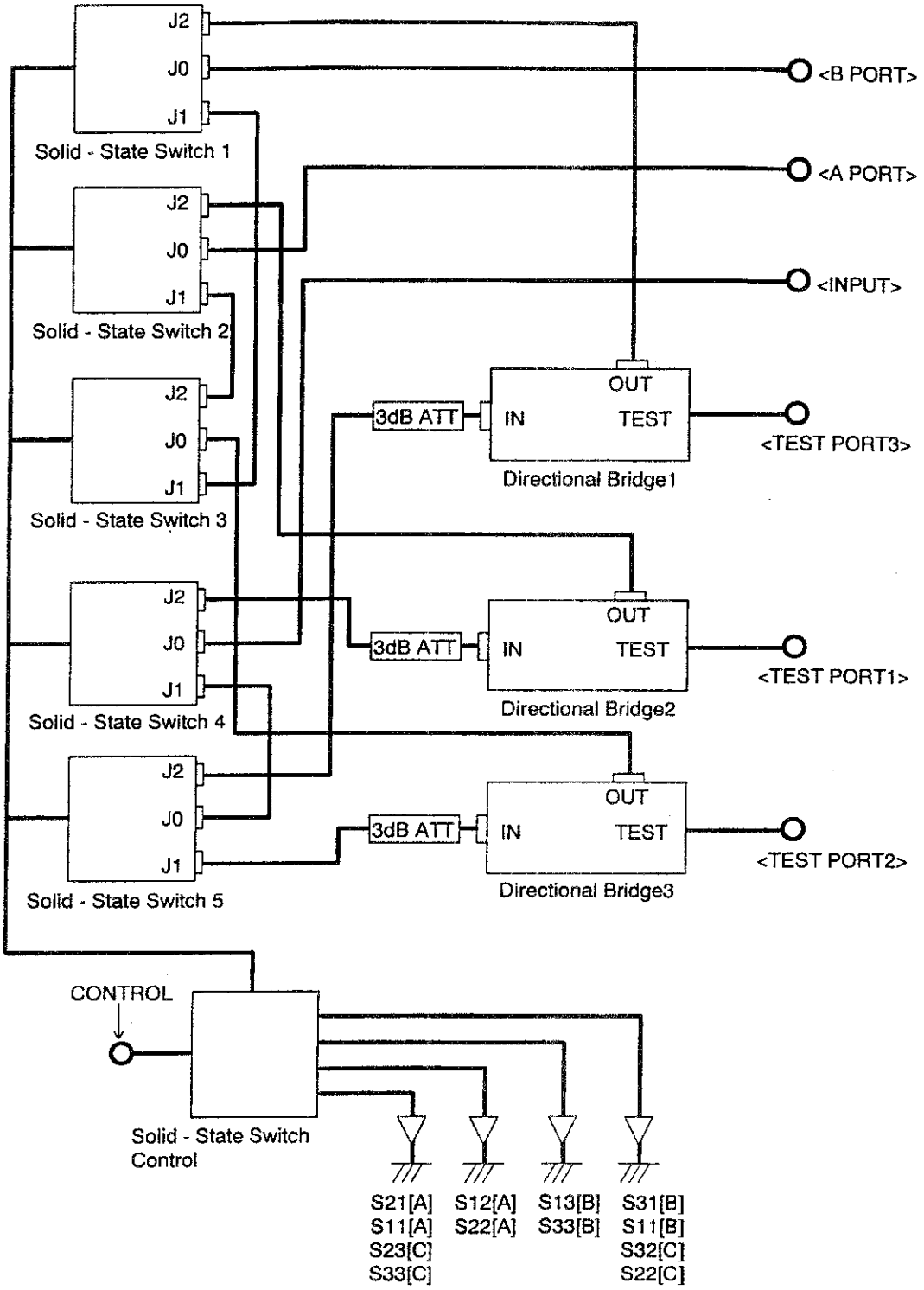


Figure 5-1 R3965A/B Operation Block Diagram

5.2 Operation of R3966A/B

(1) Reflection characteristics

① When TEST-PORT CONNECTION [A(P1-P2)], S11[A] is set:

The signal is input from PORT1. This signal is passed through J0 and J1 of SW2 and output to <TEST PORT1>.
Reflected components from <TEST PORT1> are passed through J2 and J0 of SW2 and output to the <PORT1>.

② When TEST-PORT CONNECTION [A(P1-P2)], S22[A] is set:

The signal is input from PORT2. This signal is passed through J0 and J1 of SW1, J1 and J0 of SW3, and output to <TEST PORT2>.
Reflected components from <TEST PORT2> are passed through J0 and J1 of SW3, J1 and J0 of SW1, and output to <PORT2>.

③ When TEST-PORT CONNECTION [B(P1-P3)], S11[B] is set:

The input signal and reflected components are passed through in the same way as the case ① above.

④ When TEST-PORT CONNECTION [B(P1-P3)], S33[B] is set:

The signal is input from PORT2. This signal is passed through J0 and J2 of SW1 and output to <TEST PORT3>.
Reflected components from <TEST PORT3> are passed through J2 and J0 of SW1 and output to <PORT2>.

⑤ When TEST-PORT CONNECTION [C(P2-P3)], S22[C] is set:

The signal is input from PORT1. This signal is passed through J0 and J1 of SW2, J2 and J0 of SW3, and output to <TEST PORT2>.
Reflected components from <TEST PORT2> are passed through J0 and J2 of SW3, J1 and J0 of SW2, and output to <PORT1>.

⑥ When TEST-PORT CONNECTION [C(P2-P3)], S33[C] is set:

The input signal and reflected components are passed through in the same way as case ④ above.

(2) Transmission characteristics

① When TEST-PORT CONNECTION [A(P1-P2)], S21[A] is set:

The signal is input from PORT1. This signal is passed through J0 and J2 of SW2 and output to <TEST PORT1>. Then, the signal is passed through the device between <TEST PORT1> and <TEST PORT2> and input into <TEST PORT2>. The signal input into <TEST PORT2> is passed through between J0 and J1 of SW3, J1 and J0 of SW1, and output to <PORT2>.

② When TEST-PORT CONNECTION [A(P1-P2)], S12[A] is set:

The signal is input from PORT2. This signal is passed through J0 and J1 of the SW1, the J1 to J0 of the SW3, and output to the <TEST PORT2>. Then, the signal is passed through the device between <TEST PORT2> and <TEST PORT1> and input into <TEST PORT1>. The signal input into <TEST PORT1> is passed through J2 and J0 of SW2, and output to <PORT1>.

③ When TEST-PORT CONNECTION [B(P1-P3)], S31[B] is set:

The signal is input from PORT1. This signal is passed through J0 and J2 of SW2 and output to <TEST PORT1>. Then, the signal is passed through the device between <TEST PORT1> and <TEST PORT3> and input into <TEST PORT3>. The signal input into <TEST PORT3> is passed through J2 and J0 of SW1, and output to <PORT2>.

④ When TEST-PORT CONNECTION [B(P1-P3)], S13[B] is set:

The signal is input from PORT2. This signal is passed through J0 and J2 of SW1 and output to <TEST PORT3>. Then, the signal is passed through the device between <TEST PORT3> and <TEST PORT1> and input into <TEST PORT1>. The signal input into <TEST PORT1> is passed through J2 and J0 of SW2, and output to <PORT1>.

⑤ When TEST-PORT CONNECTION [C(P2-P3)], S32[C] is set:

The signal is input from PORT1. This signal is passed through J0 and J1 of SW2, the J2 and J0 of SW3, and output to <TEST PORT2>. Then, the signal is passed through the device between <TEST PORT2> and <TEST PORT3> and input into <TEST PORT3>. The signal input into <TEST PORT3> is passed through J2 and J0 of SW1 and output to <PORT2>.

⑥ When TEST-PORT CONNECTION [C(P2-P3)], S23[C] is set:

The signal is input from PORT2. This signal is passed through between J0 and J2 of SW1 and output to <TEST PORT3>. Then, the signal is passed through the device between <TEST PORT3> and <TEST PORT2> and input into <TEST PORT2>. The signal input into <TEST PORT2> is passed through between the J0 and J2 of the SW3, J1 and J0 of SW1, and output to <PORT1>.

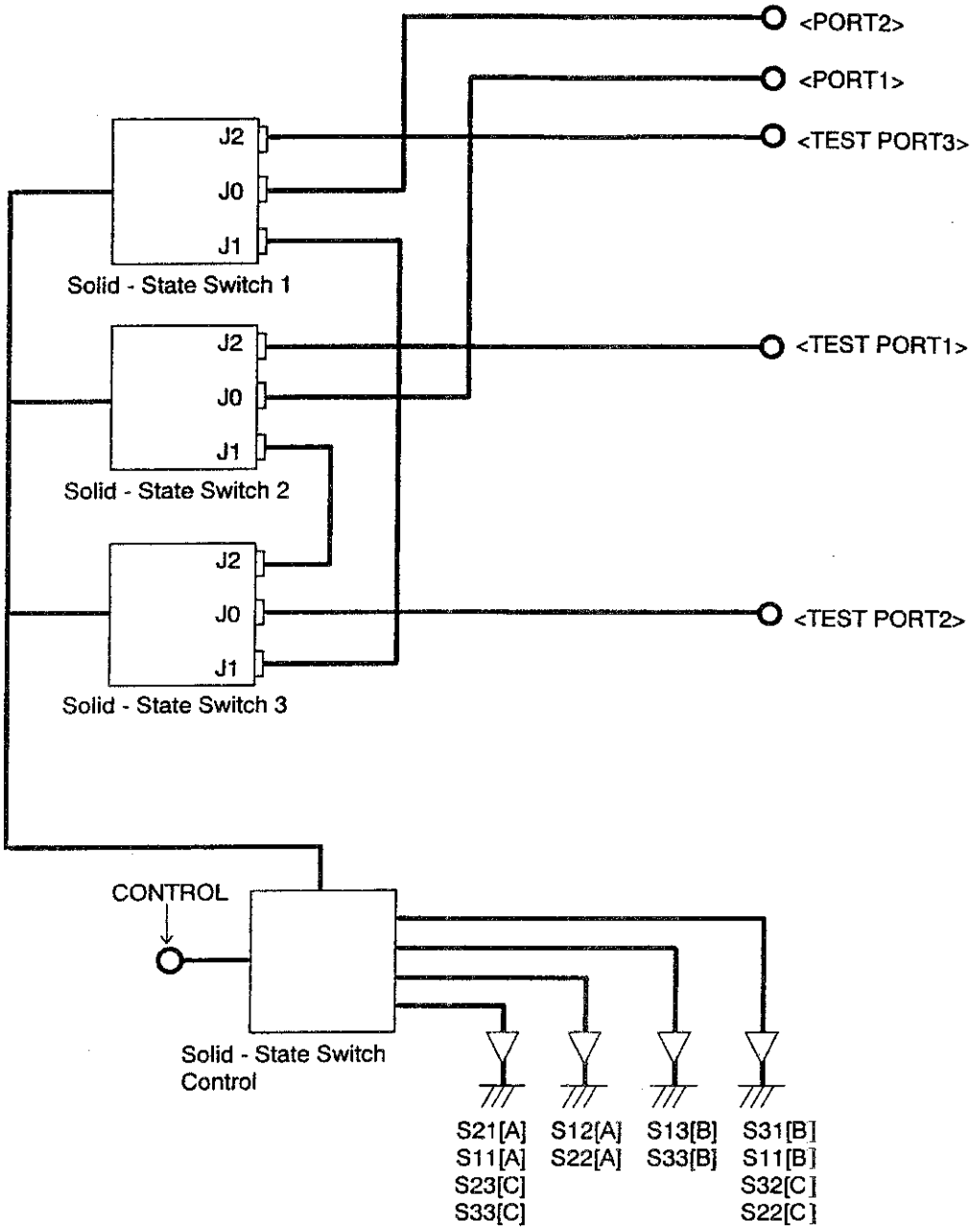


Figure 5-2 R3966A/B Operation Block Diagram

6 PERFORMANCE TESTS

6.1 Preparations for the Tests

(1) Warm-up

Warm up the instrument at least 60 minutes before starting the performance tests.

Use the **PRESET** key to initialize the instrument before the start of every test item.

(2) Instrument Preparation

Prepare the following equipment for the tests listed as indicated on the chart below:

Test	Equipment	Remarks
Directivity	Calibration kit	For R3965A/B only See Section 6.2
Test port load match	Calibration kit RF cable (TEST CABLE)	For R3965A/B only See Section 6.3
Frequency characteristics	Calibration kit RF cable (TEST CABLE)	For R3965A/B only See Section 6.4
Insertion loss	RF cable (TEST CABLE) Conversion adapter	See Section 6.5
Isolation	Calibration kit RF cable (TEST CABLE) Conversion adapter	See Section 6.6

Calibration kit: Model 9617A3 (18GHz, N connector) for the R3965A and R3966A.
Calibration kit: Model 9617F3 (18GHz, 3.5mm connector) for the R3965B and R3966B.
RF cable: Use cables with good frequency characteristics (approx. 0.25dB/GHz).
Use N-connector cables for the R3965A and R3966A.
Use SMA-connector cables for the R3965B and R3966B.
Conversion adapter: HRM-554S
For the R3965B and R3966B, use adapters which convert the network analyzer ports to SMA.

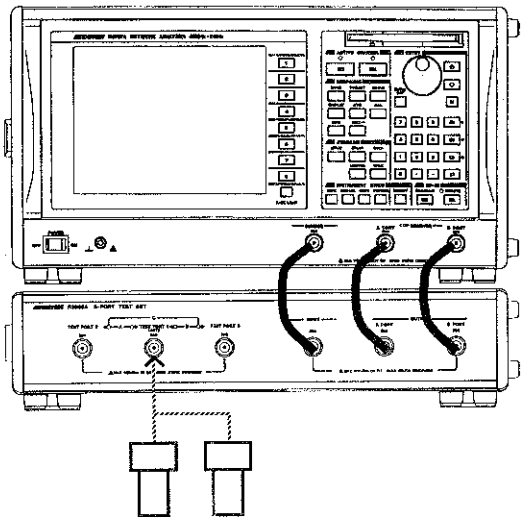
(3) Take account of the RF cables* frequency characteristics when performing a in the performance test.

(4) General precautions

- Use 90VAC to 250VAC and 48Hz to 66Hz input power.
- Connect the power cable only after turning the POWER switch OFF.
- Perform tests under the following environmental conditions only.
  Test temperature range: +25°C ±5°C
  Relative humidity: 80% or lower
  Places free from dust, vibration, noise and so on.

6.2 Directivity (R3965A/B only)

① Connect the instrument to the network analyzer.



SHORT LOAD

② Perform NORMALIZE (SHORT) for TEST PORT1

②-1 **CH1, MEAS, *TEST-PORT CONNECTION [A(P1-P2)], S11[A] REFL FWD(PORT1)***

②-2 Connect the short standard to TEST PORT1.

CAL, *NORMALIZE(SHORT)*

③ Connect the load standard to TEST PORT1 and read the directivity value from the trace data using the marker.

VERIFY	Directivity of TEST PORT1	40MHz to 2.6GHz	–30dB typical
		2.6GHz to 3.8GHz	–29dB typical
		3.8GHz to 8.0GHz	–25dB typical

④ Perform NORMALIZE (SHORT) for TEST PORT2.

④-1 **CH1, MEAS, *TEST-PORT CONNECTION [A(P1-P2)], S22[A] REFL REV(PORT2)***

④-2 Connect the short standard to TEST PORT2.

④-3 **CAL, *NORMALIZE(SHORT)***

⑤ Connect the load standard to TEST PORT2 and read the directivity value from the trace data using the marker.

VERIFY	Directivity of TEST PORT2	40MHz to 2.6GHz	–30dB typical
		2.6GHz to 3.8GHz	–29dB typical
		3.8GHz to 8.0GHz	–25dB typical

⑥ Perform NORMALIZE (SHORT) for TEST PORT3.

⑥-1 **CH1, MEAS, *TEST-PORT CONNECTION[B(P1-P3)], S33[B] REFL REV(PORT3)***

⑥-2 Connect the short standard to TEST PORT3.

⑥-3 **CAL, *NORMALIZE(SHORT)***

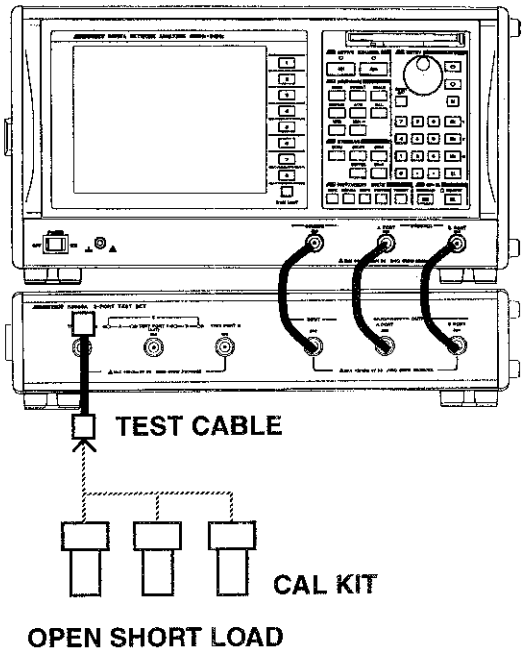
⑦ Connect the load standard to TEST PORT3 and read the directivity value from the trace data using the marker.

VERIFY	Directivity of TEST PORT3	40MHz to 2.6GHz	–30dB typical
		2.6GHz to 3.8GHz	–29dB typical
		3.8GHz to 8.0GHz	–25dB typical

6.3 Test Port Load Match (R3965A/B only)

① Connect the instrument to the network analyzer.

② Connect the test cable to TEST PORT2 and perform a 1PORT FULL CAL.



②-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S22[A] REFL REV(PORT2)***

②-2 **CAL, *CAL MENUS, 1PORT FULL CAL***

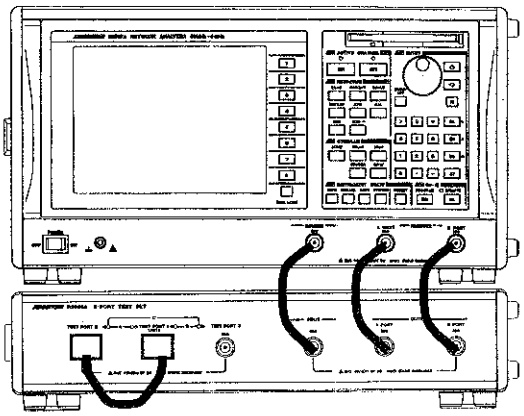
②-3 Connect the open standard to the test cable and press the ***OPEN*** key.

②-4 Connect the short standard to the test cable and press the ***SHORT*** key

②-5 Connect the load standard to the test cable and press the ***LOAD*** key.

②-6 Press the ***DONE 1-PORT*** key.

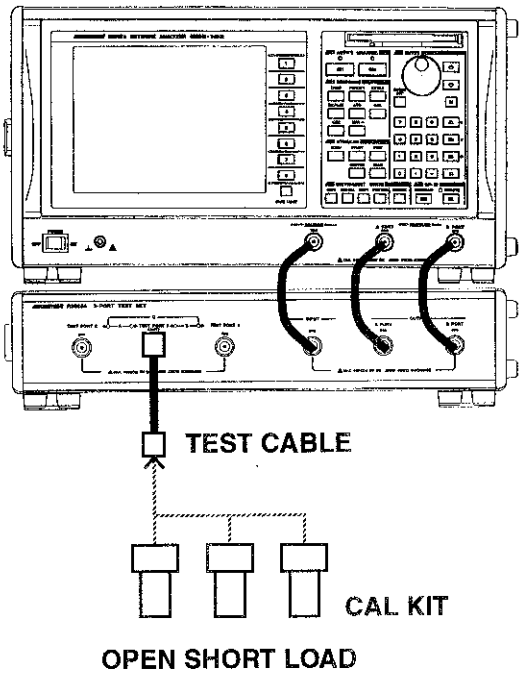
③ Connect the test cable to TEST PORT1 and read the test port load match value from the trace data using the marker.



VERIFY Load match of TEST PORT1

40MHz to 2.6GHz	–25dB typical
2.6GHz to 3.8GHz	–20dB typical
3.8GHz to 8.0GHz	–14dB typical

④ Connect the test cable to TEST PORT1 and perform a 1PORT FULL CAL.



④-1 **CH1, MEAS, *TEST-PORT CONNECTION [A(P1-P2)], S11[A] REFL FWD(PORT1)***

④-2 **CAL, *CAL MENUS, 1PORT FULL CAL***

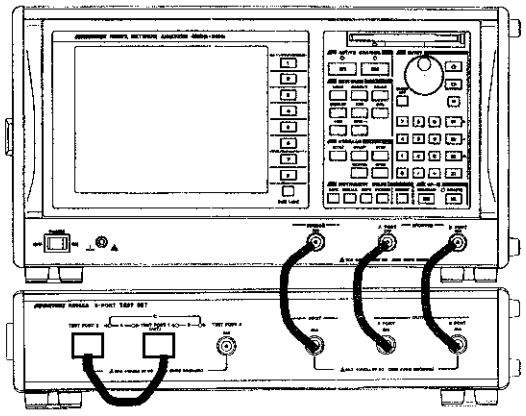
④-3 Connect the open standard to the test cable and press the **OPEN** key.

④-4 Connect the short standard to the test cable and press the ***SHORT*** key.

④-5 Connect the load standard to the test cable and press the ***LOAD*** key.

④-6 Press the ***DONE 1-PORT*** key.

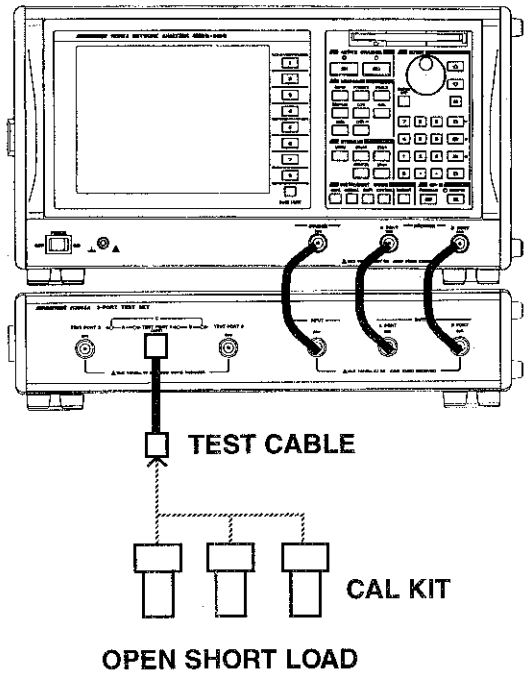
⑤ Connect the test cable to TEST PORT2 and read the test port load match value from the trace data using the marker.



VERIFY Load match of TEST PORT2

40MHz to 2.6GHz	–25dB typical
2.6GHz to 3.8GHz	–20dB typical
3.8GHz to 8.0GHz	–14dB typical

⑥ Connect the test cable to TEST PORT1 and perform a 1PORT FULL CAL.



⑥-1 **CH1, MEAS, *TEST-PORT CONNECTION [B(P1-P3)], S11[B] REFL FWD(PORT1)***

⑥-2 **CAL, *CAL MENUS, 1PORT FULL CAL***

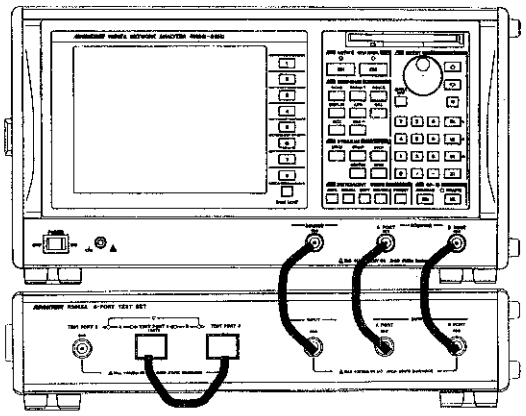
⑥-3 Connect the open standard to the test cable and press the ***OPEN*** key.

⑥-4 Connect the short standard to the test cable and press the ***SHORT*** key.

⑥-5 Connect the load standard to the test cable and press the ***LOAD*** key.

⑥-6 Press the ***DONE 1-PORT*** key.

⑦ Connect the test cable to the TEST PORT3 and read the test port load match value from the trace data using the marker.



VERIFY Load match of TEST PORT3

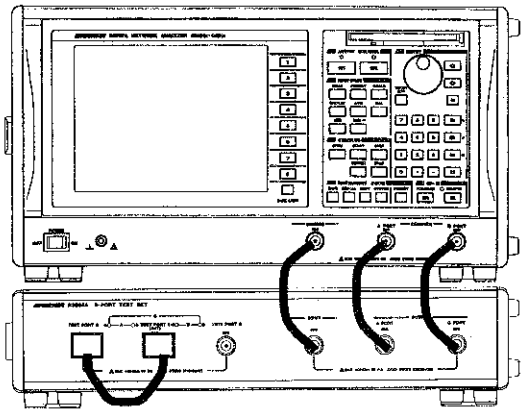
40MHz to 2.6GHz	–25dB typical
2.6GHz to 3.8GHz	–20dB typical
3.8GHz to 8.0GHz	–14dB typical

6.4 Frequency Characteristics (R3965A/B only)

6.4.1 Transmission Magnitude (R3965A/B only)

① Connect the instrument to the network analyzer.

② Connect the test cable between TEST PORT1 and TEST PORT2.



②-1 **MEAS,** ***TEST-PORT CONNECTION [A(P1-P2)], S21[A] TRNS FWD(P1→P2)***

②-2 **SCALE,** ***AUTO SCALE***

③ Read the frequency characteristics from the trace data using the marker.

③-1 **MKR→,** ***MKR SEARCH [ ], RIPPLE, MAX-MIN***

③-2 The transmission magnitude from TEST PORT1 to TEST PORT2 is displayed as a maker value.

VERIFY Transmission magnitude between TEST PORT1 and TEST PORT2
4dB p-p typical

④ Set the network analyzer to measure frequency characteristics from TEST PORT2 to TEST PORT1.

④-1 **MEAS,** ***TEST-PORT CONNECTION [A(P1-P2)], S12[A] TRNS REV(P1←P2)***

④-2 **SCALE,** ***AUTO SCALE***

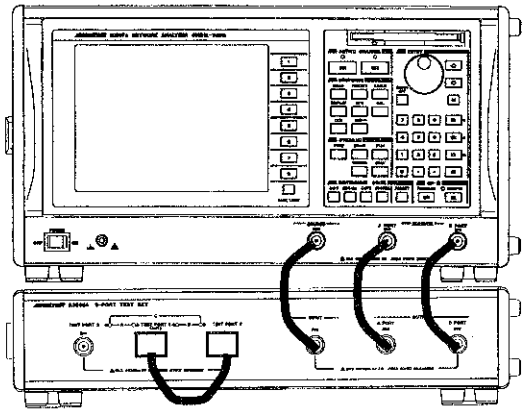
⑤ Read the frequency characteristics from the trace data using the marker.

⑤-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

⑤-2 The transmission magnitude of TEST PORT2 to TEST PORT1 is displayed as a marker value.

VERIFY Transmission magnitude from TEST PORT2 to TEST PORT1
4dB p-p typical

⑥ Connect the test cable between TEST PORT3 and TEST PORT1.



⑥-1 **CH1, MEAS, *TEST-PORT CONNECTION [B(P1-P3)], S31[B] TRNS FWD(P1→P3)***

⑥-2 **SCALE, *AUTO SCALE***

⑦ Read the frequency characteristics from the trace data using the marker.

⑦-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

⑦-2 The transmission magnitude of TEST PORT1 to TEST PORT3 is displayed as a marker value.

VERIFY Transmission magnitude of TEST PORT1 to TEST PORT 3
4dB p-p typical

⑧ Set the network analyzer to measure the frequency characteristics from TEST PORT3 to TEST PORT1.

⑧-1 **MEAS, *TEST-PORT CONNECTION [B(P1-P3)], S13[B] TRNS REV(P1←P3)***

⑧-2 **SCALE, *AUTO SCALE***

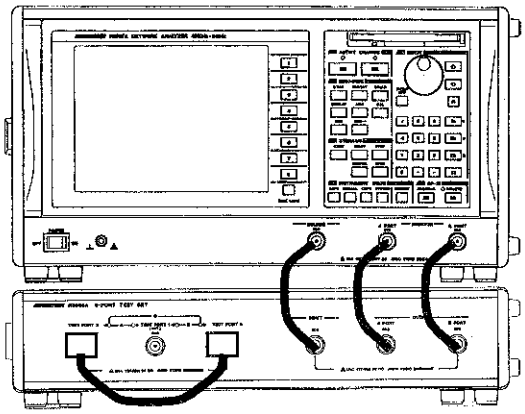
⑨ Read the frequency characteristics from the trace data using the marker.

⑨-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

⑨-2 The transmission magnitude from TEST PORT3 to TEST PORT1 is displayed as a marker value.

VERIFY Transmission magnitude from TEST PORT3 to TEST PORT1
4dB p-p typical

⑩ Connect the test cable between TEST PORT2 and TEST PORT3.



⑩-1 **CH1, MEAS, *TEST-PORT CONNECTION [C(P2-P3)], S32[C] TRNS FWD(P2→P3)***

⑩-2 **SCALE, *AUTO SCALE***

⑪ Read the frequency characteristics from the trace data using the marker.

⑪-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

⑪-2 The transmission magnitude from TEST PORT2 to TEST PORT3 is displayed as a marker value.

VERIFY Transmission magnitude from TEST PORT2 to TEST PORT3
4dB p-p typical

⑫ Set the network analyzer to measure the frequency characteristics from TEST PORT3 to TEST PORT2.

⑫-1 **MEAS, *TEST-PORT CONNECTION [C(P2-P3)], S23[C] TRNS REV(P2←P3)***

⑫-2 **SCALE, *AUTO SCALE***

⑬ Read the frequency characteristics from the trace data using the marker.

⑬-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

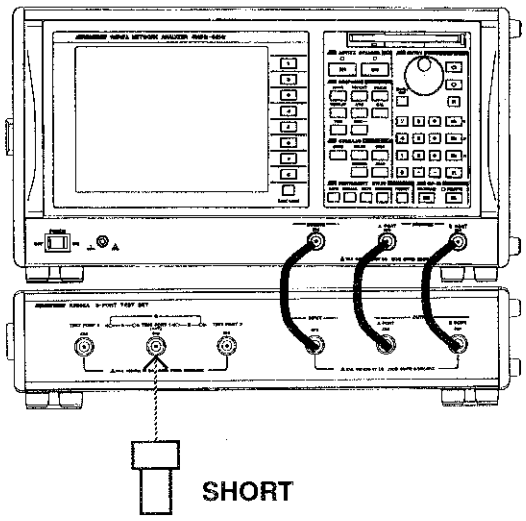
⑬-2 The transmission magnitude from TEST PORT3 to TEST PORT2 is displayed as a maker value.

VERIFY Transmission magnitude from TEST PORT3 to TEST PORT2
4dB p-p typical

6.4.2 Reflection Magnitude (R3965A/B only)

① Connect the instrument to the network analyzer.

② Connect the short standard to TEST PORT1.



②-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S11[A] REFL FWD(PORT1)***

②-2 **SCALE, *AUTO SCALE***

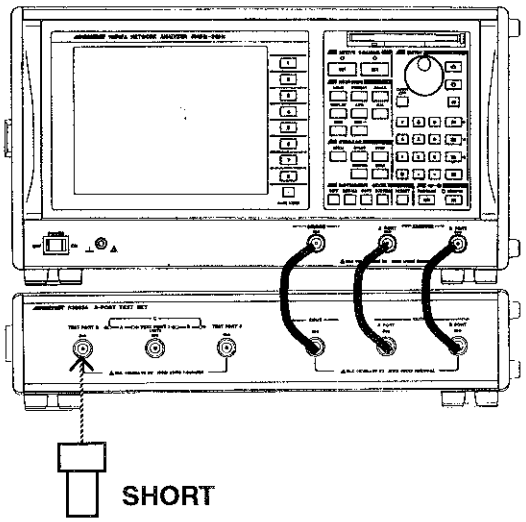
③ Read the frequency characteristics from the trace data using the marker.

③-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

③-2 The frequency characteristics of TEST PORT1 are displayed as a marker value.

VERIFY Frequency characteristics of the TEST PORT1 6dB p-p typical

④ Connect the short standard to TEST PORT2.



④-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S22[A] REFL REV(PORT2)***

④-2 **SCALE, *AUTO SCALE***

⑤ Read the frequency characteristics from the trace data using the marker.

⑤-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

⑤-2 The frequency characteristics of TEST PORT2 are displayed as a marker value.

VERIFY Reflection magnitude of TEST PORT2 6dB p-p typical

⑥ Set TEST PORT2 to three-port mode and measure the reflection magnitude.

⑥-1 **CH1, MEAS, *TEST-PORT CONNECTION [C(P2-P3)], S22[C] REFL FWD(PORT2)***

⑥-2 **SCALE, *AUTO SCALE***

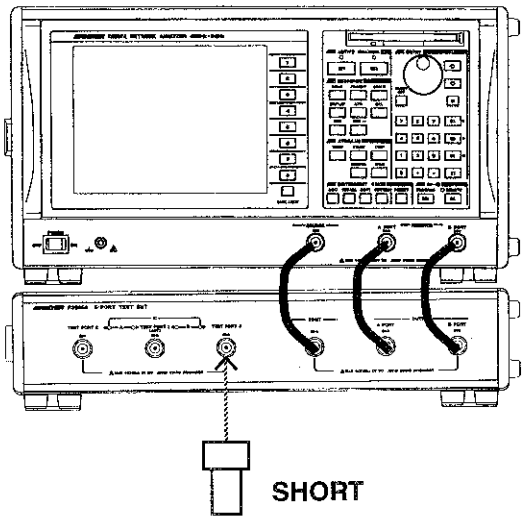
⑦ Read the frequency characteristics from the trace data using the marker.

⑦-1 **MKR→, *MKR SEARCH [ ], RIPPLE, MAX-MIN***

⑦-2 The frequency characteristics of TEST PORT2 are displayed as a marker value.

VERIFY Reflection magnitude of TEST PORT3 in the three-port setting
6dB p-p typical.

⑧ Connect the short standard to the TEST PORT3.



⑧-1 **CH1, MEAS,** ***TEST-PORT CONNECTION[B(P1-P3)], S33[B] REFL REV(PORT3)***

⑧-2 **SCALE,** ***AUTO SCALE***

⑨ Read the frequency characteristics from the trace data using the marker.

⑨-1 **MKR→,** ***MKR SEARCH [ ], RIPPLE, MAX-MIN***

⑨-2 The frequency characteristics of TEST PORT3 are displayed as a marker value.

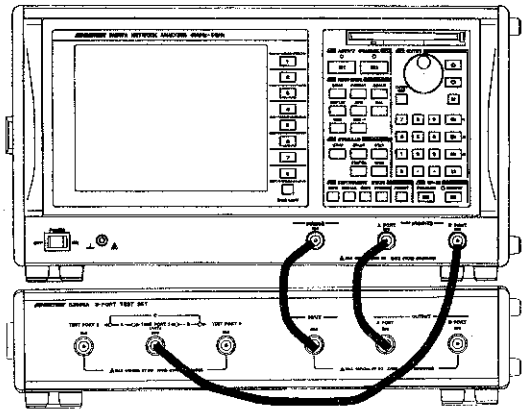
VERIFY Reflection magnitude of TEST PORT3 6dB p-p typical

6.5 Insertion Loss

(1) R3965A/B

① Connect the instrument to the network analyzer.

② Change the cable connection as shown below.



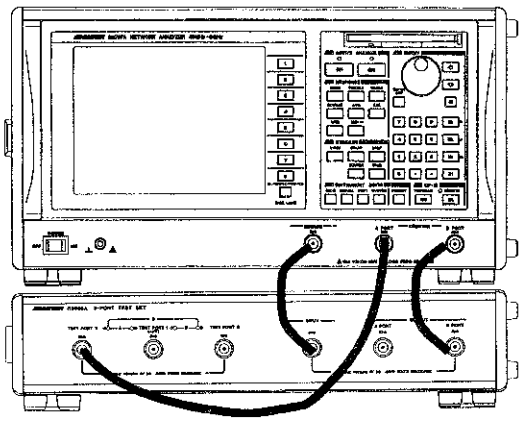
②-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S21[A] TRANS FWD(P1→P2)***

②-2 **SCALE, *AUTO SCALE***

③ Read the insertion loss from INPUT to TEST PORT1 out of the trace data using the marker.

VERIFY Insertion loss from INPUT to TEST PORT1 –11dB typical

④ Change the cable connection as shown below.



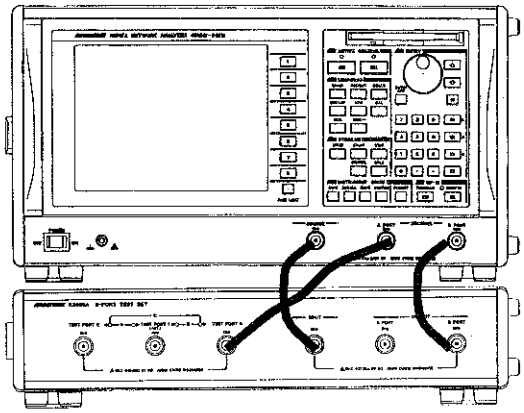
④-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S12[A] TRNS REV(P1←P2)***

④-2 **SCALE, *AUTO SCALE***

⑤ Read the insertion loss from INPUT to TEST PORT2 out of the trace data using the marker.

VERIFY Insertion loss from INPUT to TEST PORT2 –14dB typical

⑥ Change the cable connection as shown below.



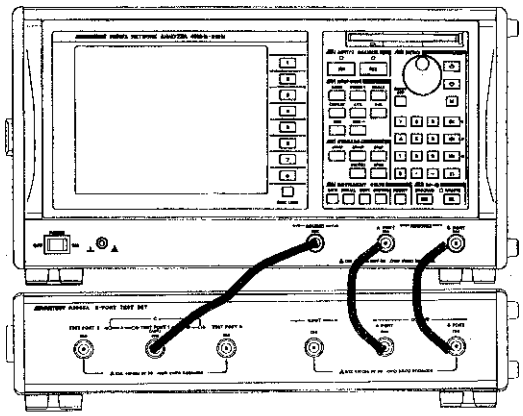
⑥-1 **CH1, MEAS, *TEST-PORT CONNECTION [B(P1-P3)], S13[B] TRNS REV(P1←P3)***

⑥-2 **SCALE, *AUTO SCALE***

⑦ Read the insertion loss from INPUT to TEST PORT3 out of the trace data using the marker.

VERIFY Insertion loss between INPUT and TEST PORT3 –14dB typical

⑧ Change the cable connection as shown below.



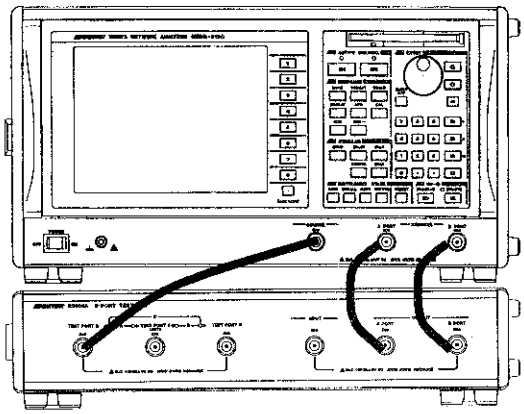
⑧-1 **CH1, MEAS, *TEST-PORT CONNECTION [A(P1-P2)], S11[A] REFL FWD(PORT1)***

⑧-2 **SCALE, A*UTO SCALE***

⑨ Read the insertion loss from TEST PORT1 to A PORT out of the trace data using the marker.

VERIFY Insertion loss from TEST PORT1 to A PORT –22dB typical

⑩ Change the cable connection as shown below.



⑩-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S22[A] REFL REV(PORT2)***

⑩-2 **SCALE, *AUTO SCALE***

⑪ Read the insertion loss from TEST PORT2 to B PORT out of the trace data using the marker.

VERIFY Insertion loss from TEST PORT2 to B PORT –25dB typical

⑫ Measure the insertion loss from TEST PORT2 to A PORT in the three-port setting.

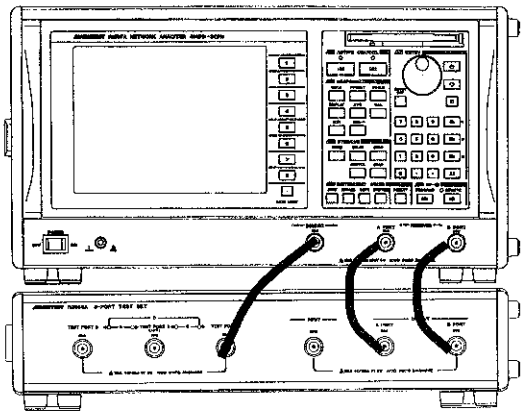
⑫-1 **CH1, MEAS, *TEST-PORT CONNECTION[C(P2-P3)], S22[C] REFL FWD(PORT2)***

⑫-2 **SCALE, *AUTO SCALE***

⑬ Measure the insertion loss from TEST PORT2 to A PORT out of the trace data using the marker.

VERIFY Insertion loss from TEST PORT2 to A PORT –25dB typical

⑭ Change the cable connection as shown below.



⑭-1 **CH1, MEAS, *TEST-PORT CONNECTION[B(P1-P3)], S33[B] REFL REV(PORT3)***

⑭-2 **SCALE, *AUTO SCALE***

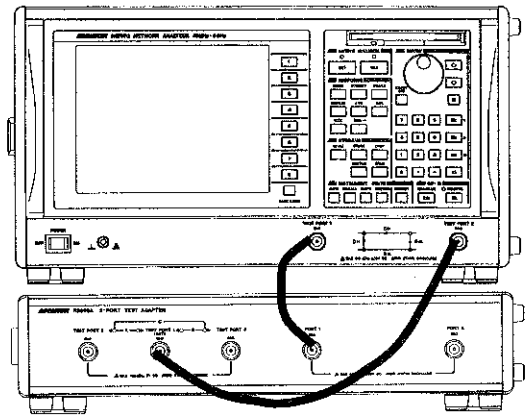
⑮ Read the insertion loss from TEST PORT3 to B PORT out of the trace data using the marker.

VERIFY Insertion loss from TEST PORT3 to B PORT –22dB typical

(2) R3966A/B

① Connect the instrument to the network analyzer.

② Change the cable connection as shown below.



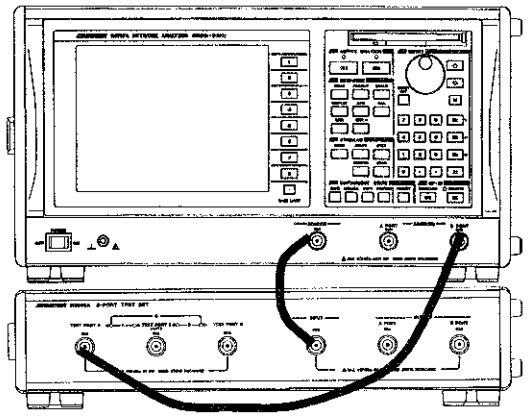
②-1 **CH1, MEAS, *TEST-PORT CONNECTION [A(P1-P2)], S21[A] TRNS FWD(P1→P2)***

②-2 **SCALE, *AUTO SCALE***

③ Read the insertion loss from PORT1 to TEST PORT1 out of the trace data using the marker.

VERIFY Insertion loss between from PORT1 to TEST PORT1 –4dB typical

④ Change the cable connection as shown below.



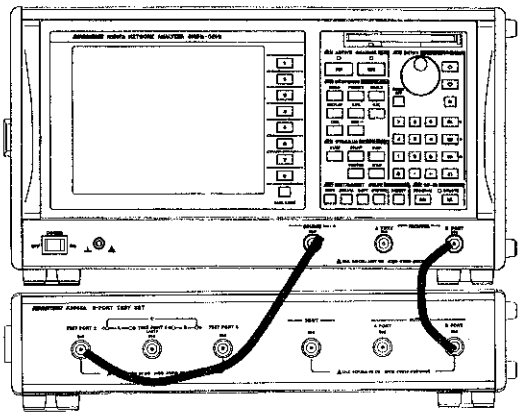
④-1 **CH1, MEAS,** ***TEST-PORT CONNECTION [C(P2-P3)], S32[C] TRNS FWD(P2→P3)***

④-2 **SCALE,** ***AUTO SCALE***

⑤ Read the insertion loss from PORT1 to TEST PORT2 out of the trace data using the marker.

VERIFY Insertion loss from PORT1 and to TEST PORT2 –6dB typical

⑥ Change the cable connection as shown below.



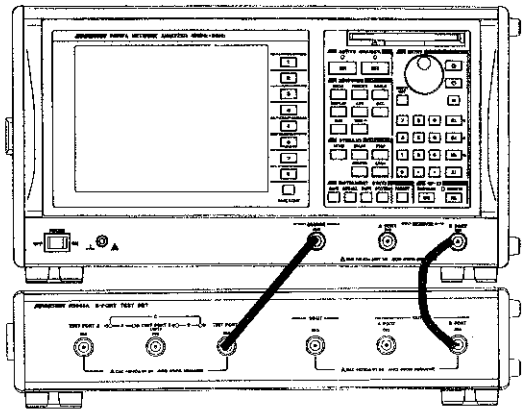
⑥-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S12[A] TRNS REV(PORT2)***

⑥-2 **SCALE, *AUTO SCALE***

⑦ Read the insertion loss from PORT2 to TEST PORT2 out of the trace data using the marker.

VERIFY Insertion loss from PORT2 to TEST PORT2 –6dB typical

⑧ Change the cable connection as shown below.



⑧-1 **CH1, MEAS, *TEST-PORT CONNECTION [B(P1-P3)], S13[B] TRNS REV(P1←P3)***

⑧-2 **SCALE, *AUTO SCALE***

⑨ Read the insertion loss from PORT2 to TEST PORT3 out of the trace data using the marker.

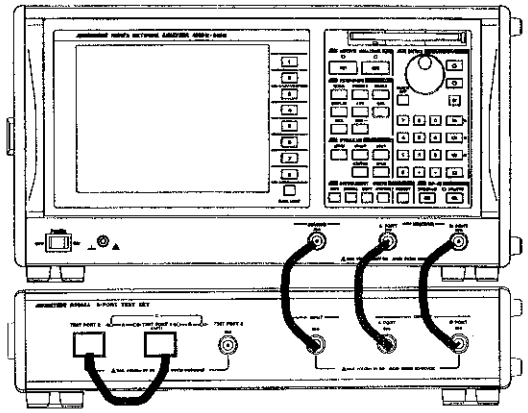
VERIFY Insertion loss from PORT2 to TEST PORT3 –4dB typical

6.6 Isolation

(1) R3965A/B

① Connect the instrument to the network analyzer.

② Connect the test cable between TEST PORT1 and TEST PORT2.



②-1 **MENU, *POINTS*, 1, 2, 0, 1, X1**

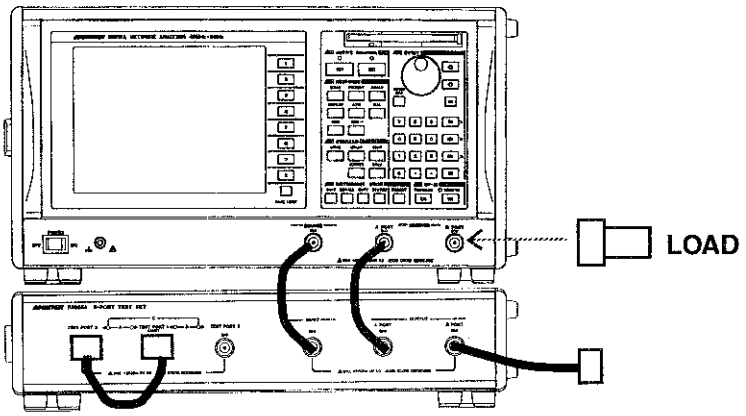
②-2 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S21[A] TRNS FWD(P1→P2)***

②-3 **SCALE, */DIV*, 1, 0, X1, *REF POS*, 5, 0, X1, *REF VALUE*, -, 9, 0, X1**

②-4 **AVG, 1, 0, 0, X1**

②-5 **CAL, *NORMLIZE (THRU)***

③ Disconnect the cable from the network analyzer B PORT and connect the Load standard to the B PORT.



③-1 **AVG, *AVG COUNT*, 6, 4, X1, *AVG STATE ON***

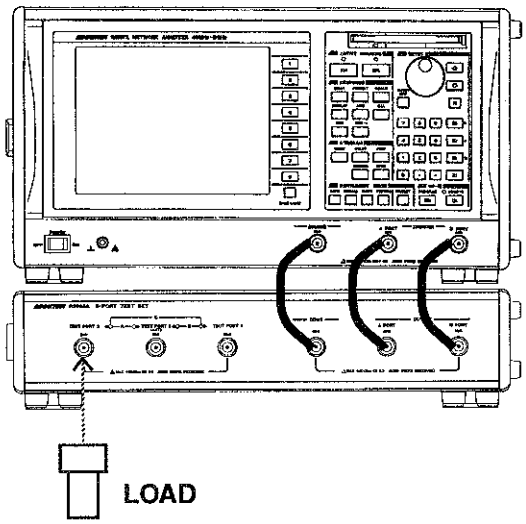
④ An average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

④-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA_MEMORY***

⑤ Connect the network analyzer B PORT to the instrument B PORT.

Disconnect the test cable between TEST PORT1 and TEST PORT2 and connect the load standard to TEST PORT2.



⑤-1 **AVG, *AVG RESTART***

⑥ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT1 to TEST PORT2

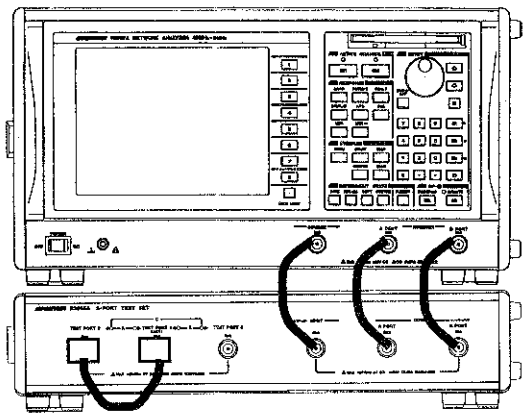
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

⑥-1 **AVG, *AVG STATE OFF***

⑥-2 **DISPLAY, *DEFINE TRACE [DATA-MEN], OFF***

⑦ Connect the test cable between TEST PORT1 and TEST PORT2.

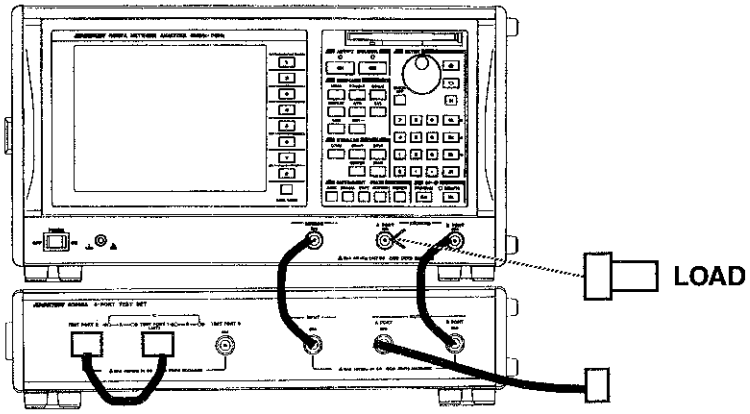


⑦-1 **CH1, MEAS,** ***TEST-PORT CONNECTION [A(P1-P2)], S12[A] TRNS REV(P1←P2)***

⑦-2 **SCALE,** ***/DIV,*** **1, 0, X1,** ***REF POS,*** **5, 0, X1,** ***REF VALUE,*** **-, 9, 0, X1**

⑦-3 **CAL,** ***NORMLIZE (THRU)***

⑧ Disconnect the cable connected to the network analyzer A PORT and connect the load standard to A PORT.



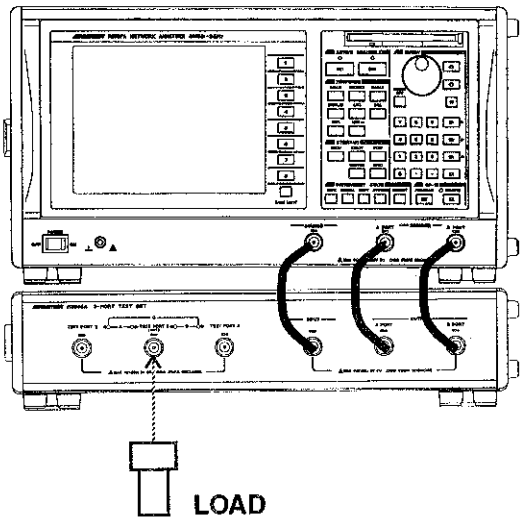
⑧-1 **AVG,** ***AVG STATE ON***

⑨ The average count is displayed in the upper left of the screen.
When the average count reaches 64, set the network analyzer as shown below.

⑨-1 **DISPLAY,** ***DATA→MEMORY, DEFINE TRACE[ ], DATA→MEMORY***

⑩ Connect the network analyzer A PORT to the instrument A PORT.

Disconnect the cable between TEST PORT1 and TEST PORT2 and connect the load standard to TEST PORT1.



⑩-1 **AVG,** ***AVG RESTART***

⑪ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT2 to TEST PORT1

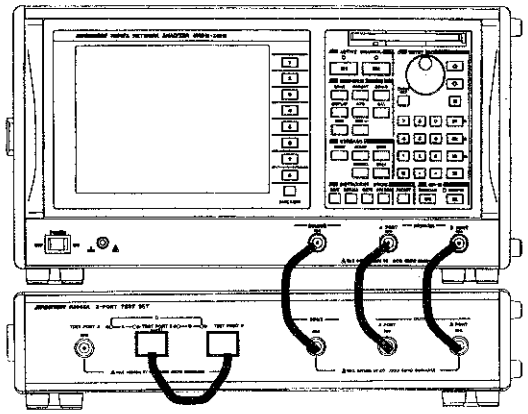
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

⑪-1 **AVG,** ***AVG STATE OFF***

⑪-2 **DISPLAY,** ***DEFINE TRACE[DATA-MEN], OFF***

⑫ Connect the test cable between TEST PORT1 and TEST PORT3.

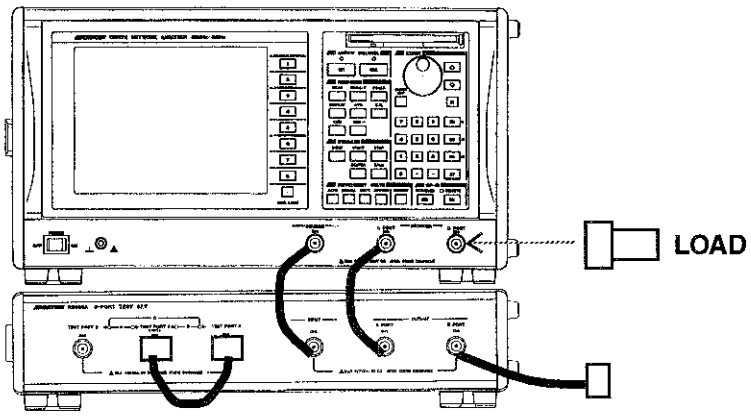


⑫-1 **CH1, MEAS, *TEST-PORT CONNECTION[(B(P1-P3)], S31[B] TRNS FWD(P1←P3)***

⑫-2 **SCALE, *//DIV,* 1, 0, X1, *REF POS,* 5, 0, X1, *REF VALUE,* -, 9, 0, X1**

⑫-3 **CAL, *NORMLIZE (THRU)***

⑬ Disconnect the cable connected to the network analyzer B PORT and connect the load standard to the B PORT.



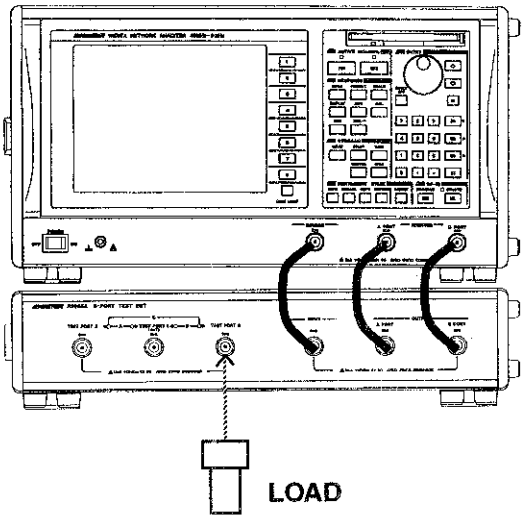
⑬-1 **AVG, *AVG STATE ON***

⑭ The average count is displayed in the upper left of the screen.
When the average count reaches 64, set the network analyzer as shown below.

⑭-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA→MEMORY***

⑮ Connect the network analyzer B PORT to the instrument B PORT.

Disconnect the cable between TEST PORT1 and TEST PORT3, and connect the load standard to TEST PORT3.



⑮-1 **AVG, *AVG RESTART***

⑯ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT1 to TEST PORT3

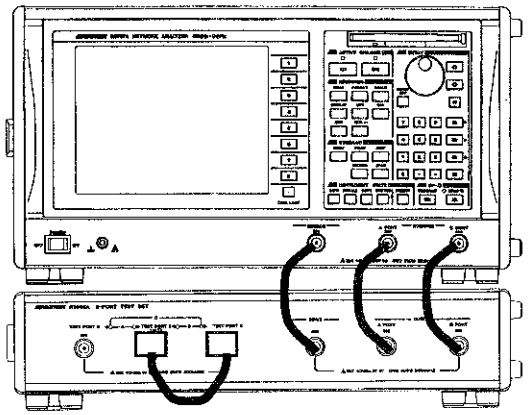
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

⑯-1 **AVG, *AVG STATE OFF***

⑯-2 **DISPLAY, *DEFINE TRACE[DATA-MEN], OFF***

⑰ Connect the test cable between TEST PORT1 and TEST PORT3.

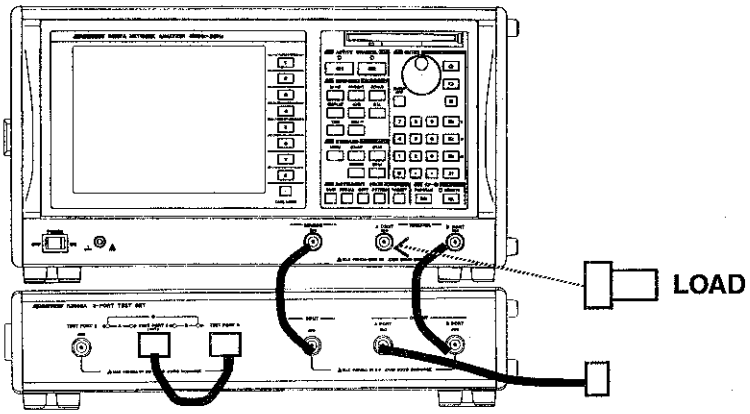


⑰-1 **CH1, MEAS, *TEST-PORT CONNECTION B(P1-P3), S13[B] TRANS REV(P1←P3)***

⑰-2 **SCALE, *//DIV,* 1, 0, X1, *REF POS,* 5, 0, X1, *REF VALUE,* -, 9, 0, X1**

⑰-3 **CAL, *NORMLIZE (THRU)***

⑱ Disconnect the network analyzer A PORT cable and connect the load standard to the A PORT.



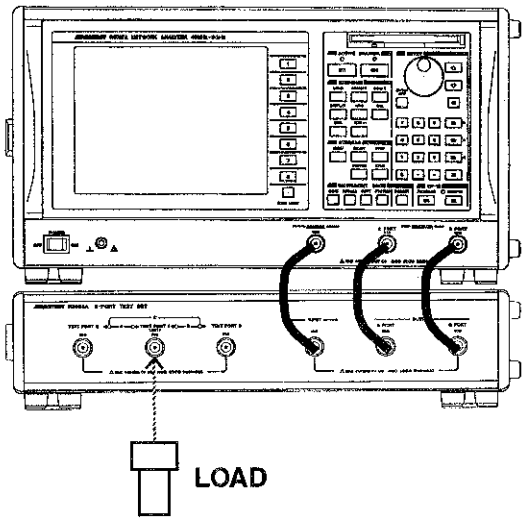
⑱-1 **AVG, *AVG STATE ON***

⑲ The average count is displayed in the upper left of the screen.
When the average count reaches 64, set the network analyzer as shown below.

⑲-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA-MEMORY***

⑳ Connect the network analyzer A PORT to the instrument A PORT.

Disconnect the test cable between TEST PORT1 and TEST PORT3 and connect the load standard to TEST PORT1.



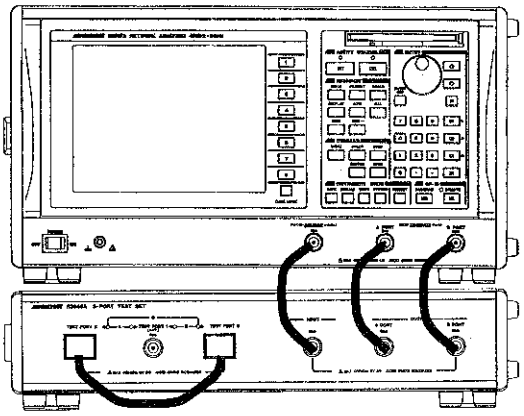
⑳-1 **AVG, *AVG RESTART***

㉑ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT3 to TEST PORT1

40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

㉒ Connect the test cable between TEST PORT2 and TEST PORT 3.

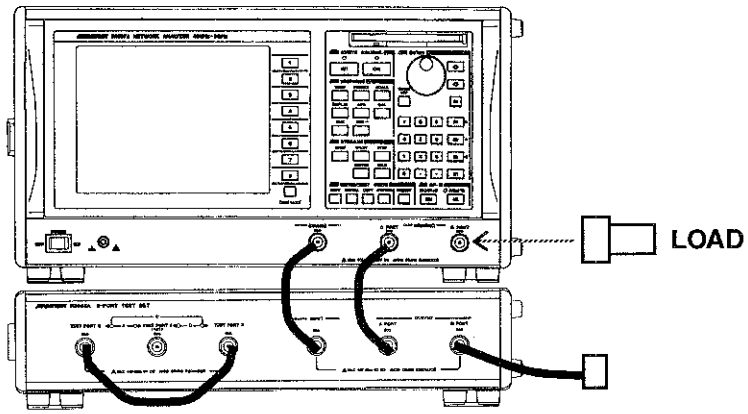


㉒-1 **CH1, MEAS, *TEST-PORT CONNECTION[C(P2-P3)], S32[C] TRANS FWD(P2→P3)***

㉒-2 **SCALE, */DIV,* 1, 0, X1, *REF POS,* 5, 0, X1, *REF VALUE,* -, 9, 0, X1**

㉒-3 **CAL, *NORMLIZE (THRU)***

㉓ Disconnect the network analyzer B PORT cable and connect the load standard to B PORT.



㉓-1 **AVG, *AVG STATE ON***

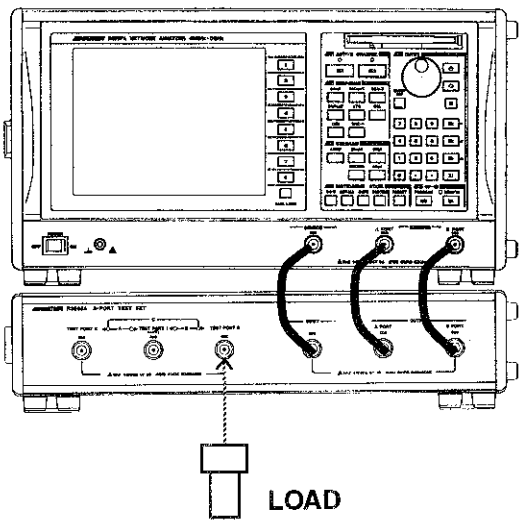
㉔ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

㉔-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA-MEMORY***

㉕ Connect the network analyzer B PORT to the instrument B PORT.

Disconnect the test cable between TEST PORT2 and TEST PORT3, and connect the load standard to TEST PORT3.



㉕-1 **AVG, *AVG RESTART***

㉖ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT2 to TEST PORT3

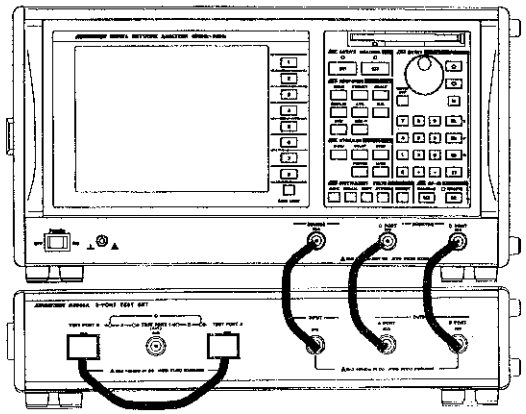
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

㉖-1 **AVG,** ***AVG STATE OFF***

㉖-2 **DISPLAY,** ***DEFINE TRACE[DATA-MEN], OFF***

㉗ Connect the cable between TEST PORT2 and TEST PORT3.

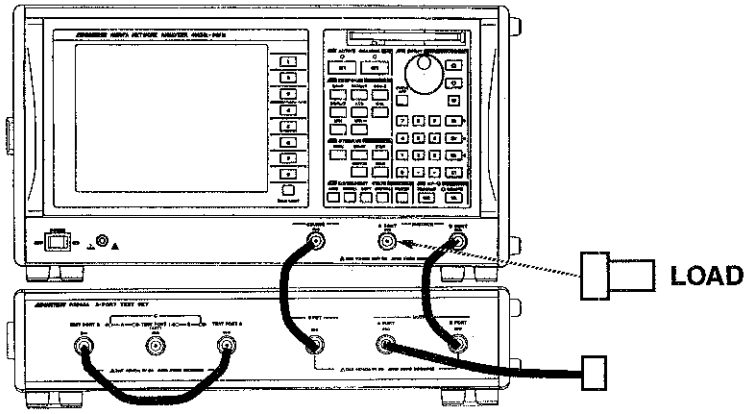


㉗-1 **CH1, MEAS,** ***TEST-PORT CONNECTION [C(P2-P3)], S23[C] TRNS REV(P2←P3)***

㉗-2 **SCALE,** ***/DIV,*** **1, 0, X1,** ***REF POS,*** **5, 0, X1,** ***REF VALUE,*** **-, 9, 0, X1**

㉗-3 **CAL,** ***NORMLIZE (THRU)***

㉘ Disconnect the network analyzer A PORT cable and connect the load standard to the A PORT.



㉘-1 **AVG, *AVG STATE ON***

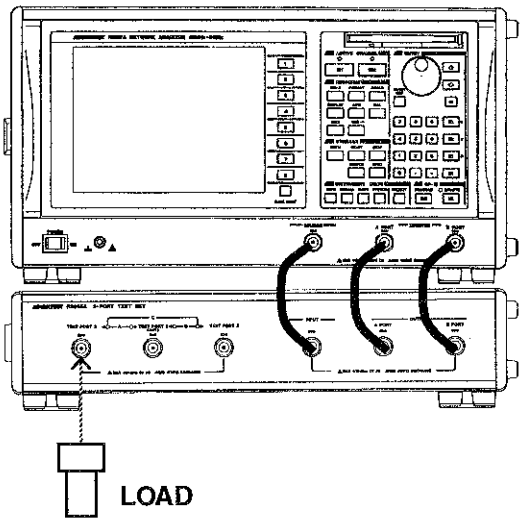
㉙ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

㉙-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA-MEMORY***

㉚ Connect the network analyzer A PORT to the instrument A PORT.

Disconnect the cable between TEST PORT2 and TEST PORT3, and connect the load standard to TEST PORT2.



㉚-1 **AVG, *AVG RESTART***

㉚-2 When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT2 from to TEST PORT3

40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

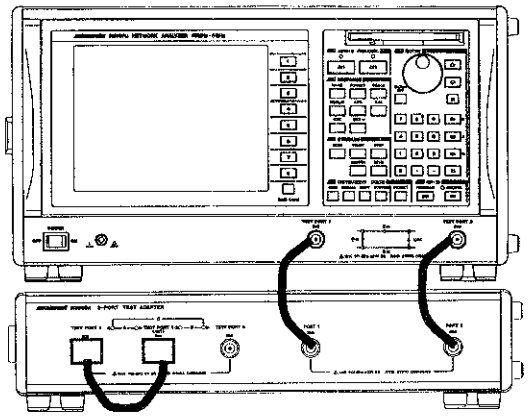
㉚-3 **AVG, *AVG STATE OFF***

㉚-4 **DISPLAY, *DEFINE TRACE[DATA-MEN], OFF***

(2) R3966A/B

① Connect the instrument to the network analyzer.

② Connect the test cable between TEST PORT1 and TEST PORT2.



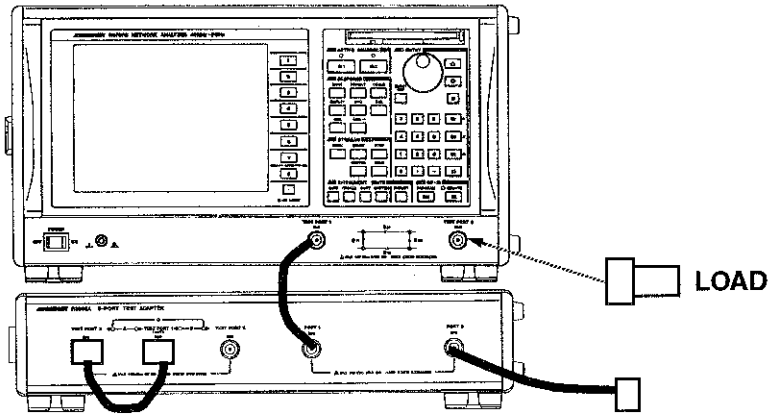
②-1 **CH1, MEAS, *TEST-PORT CONNECTION[A(P1-P2)], S21[A] TRNS FWD(P1→P2)***

②-2 **SCALE, */DIV*, 1, 0, X1, *REF POS*, 5, 0, X1, *REF VALUE*, -, 9, 0, X1**

②-3 **AVG, 1, 0, 0, X1**

②-4 **CAL, *NORMLIZE (THRU)***

③ Disconnect the network analyzer TEST PORT2 cable and connect the load standard to TEST PORT2.



③-1 **AVG, *AVG COUNT*, 6, 4, X1, *AVG STATE ON***

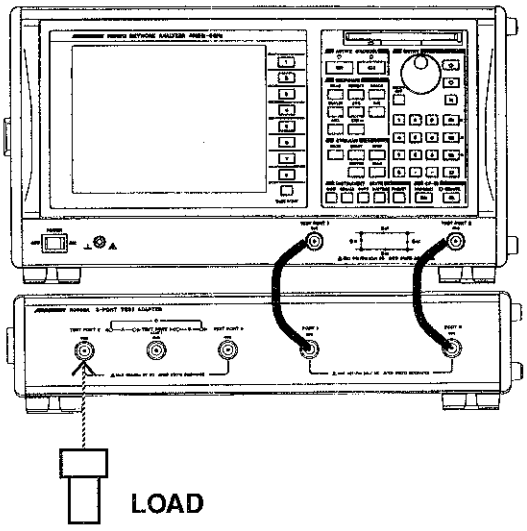
④ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

④-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA→MEMORY***

⑤ Connect TEST PORT2 of the network analyzer to PORT2 of the instrument.

Disconnect the cable from TEST PORT1 and TEST PORT2, and connect the load standard to TEST PORT2.



⑤-1 **AVG, *AVG RESTART***

⑥ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation of TEST PORT1 from TEST PORT2

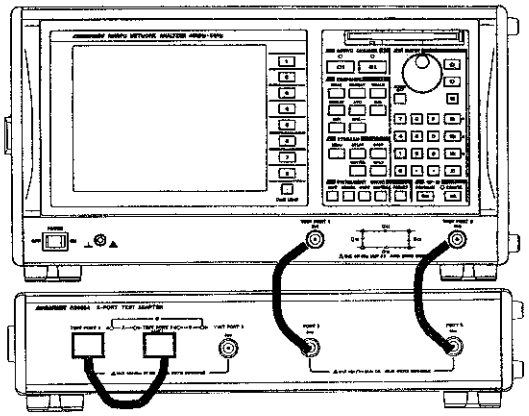
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

⑥-1 **AVG, *AVG STATE OFF***

⑥-2 **DISPLAY, *DEFINE TRACE[DATA-MEN], OFF***

⑦ Connect the test cable between TEST PORT1 and TEST PORT2.

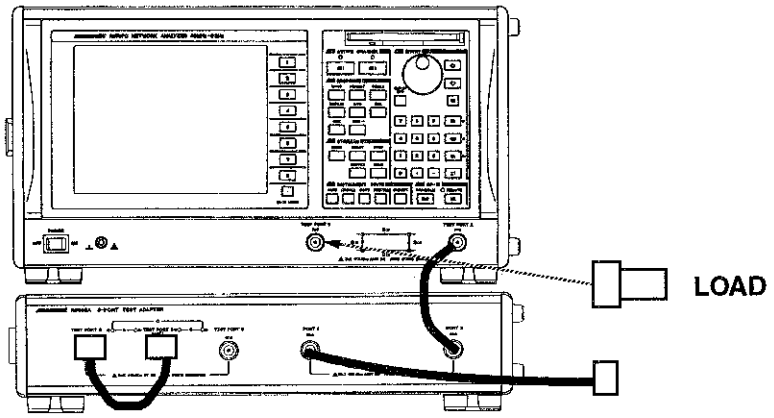


⑦-1 **CH1, MEAS, *TEST-PORT CONNECTION [A(P1-P2)], S12[A] TRNS REV(P1←P2)***

⑦-2 **SCALE, */DIV*, 1, 0, X1, *REF POS*, 5, 0, X1, *REF VALUE*, -, 9, 0, X1**

⑦-3 **CAL, *NORMLIZE (THRU)***

⑧ Disconnect the cable connected to the network analyzer TEST PORT1 and connect the load standard to TEST PORT1.



⑧-1 **AVG, *AVG STATE ON***

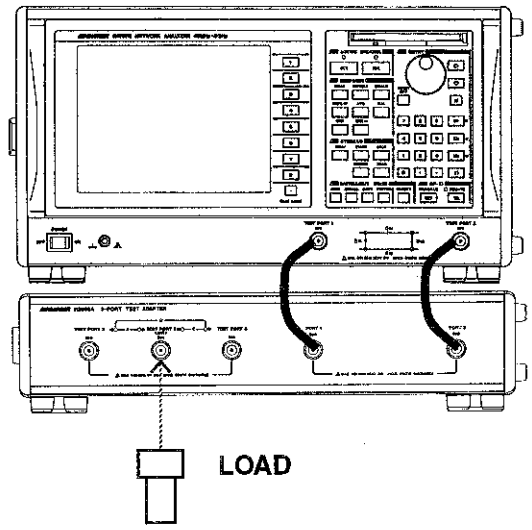
⑨ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

⑨-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA→MEMORY***

⑩ Connect the network analyzer TEST PORT1 to the instrument PORT1.

Disconnect the cable between TEST PORT1 and TEST PORT2, and connect the load standard to TEST PORT1.



⑩-1 **AVG, *AVG RESTART***

⑪ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT2 to TEST PORT1

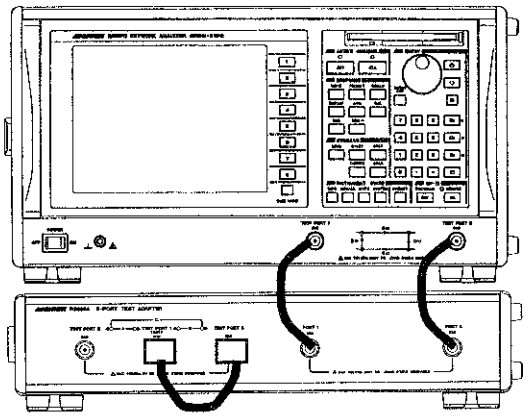
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

⑪-1 **AVG, *AVG STATE OFF***

⑪-2 **DISPLAY, *DEFINE TRACE[DATA-MEN], OFF***

⑫ Connect the test cable between TEST PORT1 and TEST PORT3.

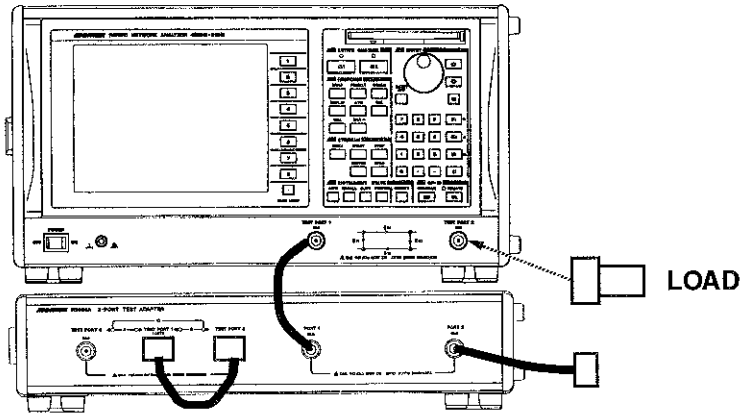


⑫-1 **CH1, MEAS, *TEST-PORT CONNECTION[B(P1-P3)], S31[B] TRNS FWD(P1→P3)***

⑫-2 **SCALE, */DIV,* 1, 0, X1, *REF POS,* 5, 0, X1, *REF VALUE,* -, 9, 0, X1**

⑫-3 **CAL, *NORMLIZE (THRU)***

⑬ Disconnect the cable connected to network analyzer TEST PORT2 and connect the load standard to TEST PORT2.



⑬-1 **AVG, *AVG STATE ON***

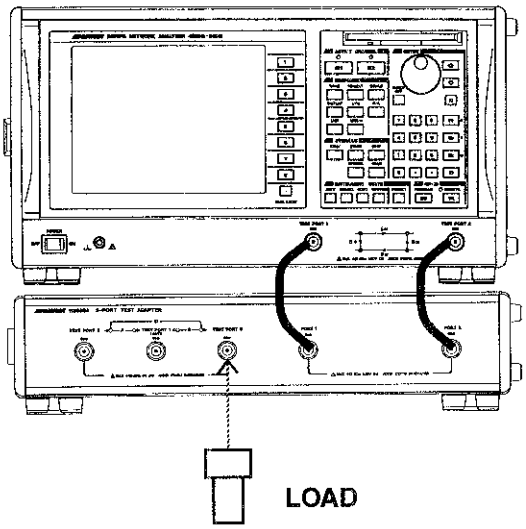
⑭ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

⑭-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA-MEMORY***

⑮ Connect the network analyzer TEST PORT2 to the instrument PORT2.

Disconnect the cable from TEST PORT1 and TEST PORT3, and connect the load standard to TEST PORT3.



⑮-1 **AVG, *AVG RESTART***

⑯ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT1 to TEST PORT3

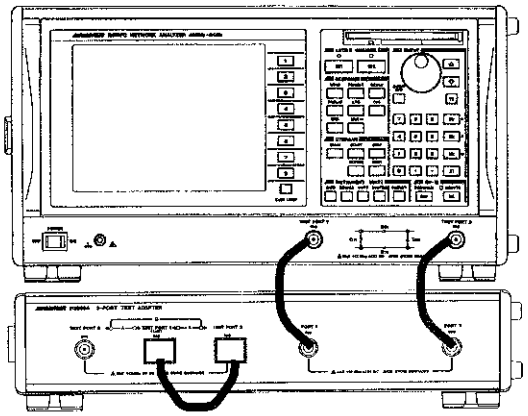
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

⑯-1 **AVG, *AVG STATE OFF***

⑯-2 **DISPLAY, *DEFINE TRACE[DATA-MEN], OFF***

⑰ Connect the test cable between TEST PORT1 and TEST PORT3.

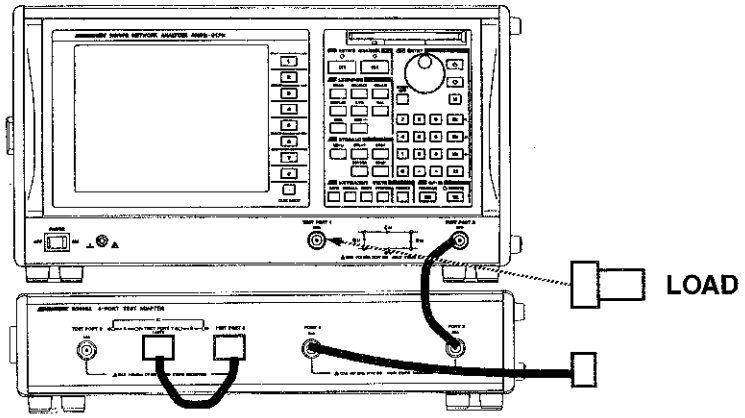


⑰-1 **CH1, MEAS, *TEST-PORT CONNECTION[B(P1-P3)], S13[B] TRANS REV(P1←P3)***

⑰-2 **SCALE, */DIV*, 1, 0, X1, *REF POS*, 5, 0, X1, *REF VALUE*, -, 9, 0, X1**

⑰-3 **CAL, *NORMLIZE (THRU)***

⑱ Disconnect the cable connected to the network analyzer TEST PORT1 and connect the load standard to TEST PORT1.



⑱-1 **AVG, *AVG STATE ON***

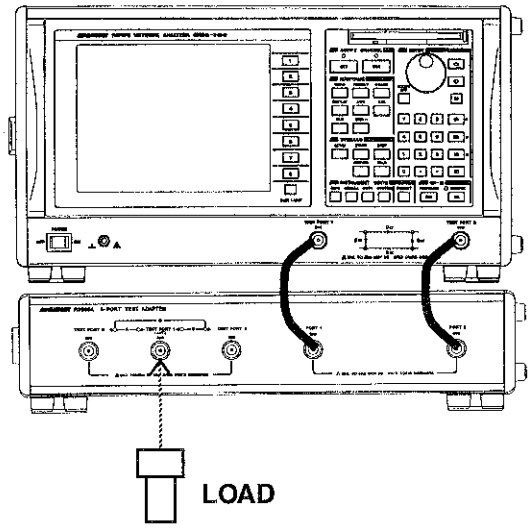
⑲ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

⑲-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA-MEMORY***

⑳ Connect the network analyzer TEST PORT1 to the instrument PORT1.

Disconnect the test cable between TEST PORT1 and TEST PORT3, and connect the load standard to TEST PORT1.



⑳-1 **AVG, *AVG RESTART***

㉑ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT3 to TEST PORT1

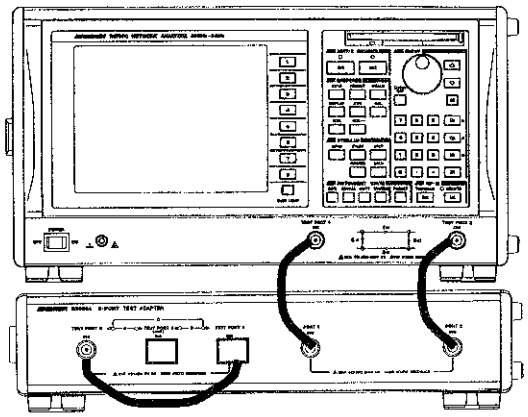
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

㉑-1 **AVG, *AVG STATE OFF***

㉑-2 **DISPLAY, *DEFINE TRACE [DATA-MEN], OFF***

㉒ Connect the test cable between TEST PORT2 and TEST PORT 3.

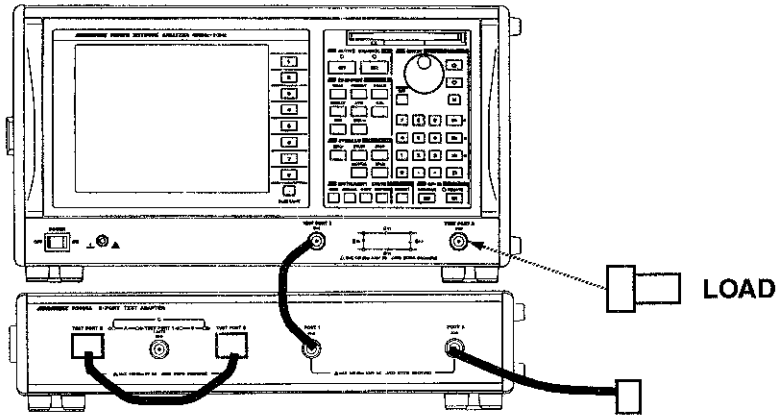


㉒-1 **CH1, MEAS, *TEST-PORT CONNECTION[C(P2-P3)], S32[C] TRNS FWD(P2→P3)***

㉒-2 **SCALE, */DIV,* 1, 0, X1, *REF POS,* 5, 0, X1, *REF VALUE,* -, 9, 0, X1**

㉒-3 **CAL, *NORMLIZE (THRU)***

㉓ Disconnect the cable connected to the network analyzer TEST PORT2 and connect the load standard to TEST PORT2.



㉓-1 **AVG, *AVG STATE ON***

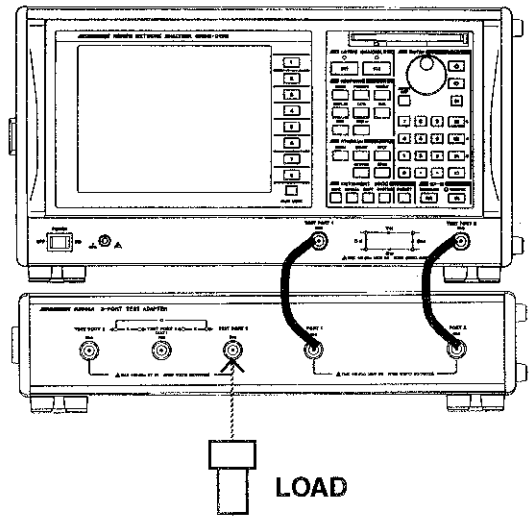
㉔ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

㉔-1 **DISPLAY, *DATA→MEMORY, DEFINE TRACE[ ], DATA-MEMORY***

㉕ Connect the network analyzer TEST PORT2 to the instrument POTR2.

Disconnect the test cable between TEST PORT2 and TEST PORT3, and connect the load standard to TEST PORT3.



㉕-1 **AVG, *AVG RESTART***

㉖ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT2 to TEST PORT3

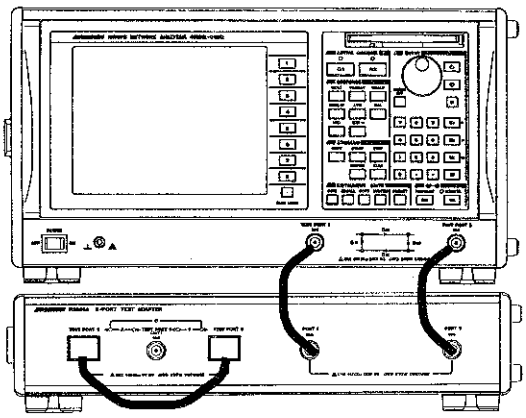
40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

Set the network analyzer as shown below after checking the above.

㉖-1 **AVG,** ***AVG STATE OFF***

㉖-2 **DISPLAY,** ***DEFINE TRACE[DATA-MEN], OFF***

㉗ Connect the test cable between TEST PORT2 and TEST PORT3.

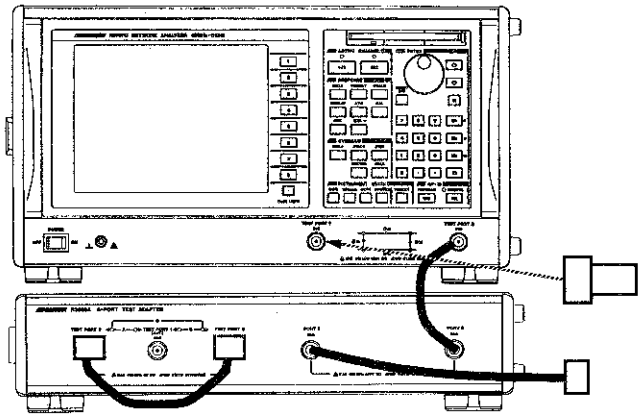


㉗-1 **CH1, MEAS,** ***TEST-PORT CONNECTION [C(P2-P3)], S23[C] TRNS REV(P2←P3)***

㉗-2 **SCALE,** ***/DIV,*** **1, 0, X1,** ***REF POS,*** **5, 0, X1,** ***REF VALUE,*** **-, 9, 0, X1**

㉗-3 **CAL,** ***NORMLIZE (THRU)***

㉘ Disconnect the cable connected to the network analyzer TEST PORT1 and connect the load standard to TEST PORT1.



㉘-1 **AVG,** ***AVG STATE ON***

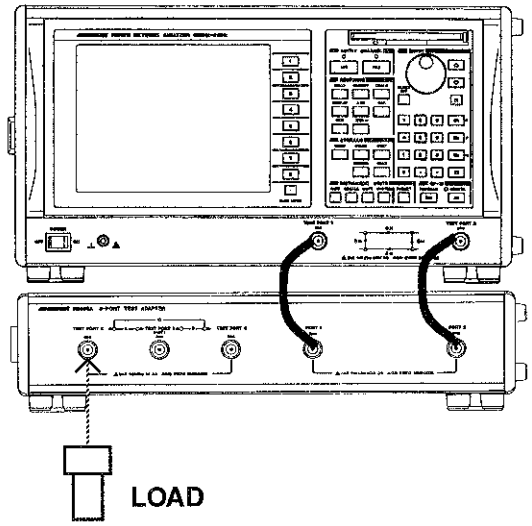
㉙ The average count is displayed in the upper left of the screen.

When the average count reaches 64, set the network analyzer as shown below.

㉙-1 **DISPLAY,** ***DATA→MEMORY, DEFINE TRACE[ ], DATA-MEMORY***

㉚ Connect the network analyzer TEST PORT1 to the instrument PORT1 .

Disconnect the cable between TEST PORT2 and TEST PORT3, and connect the load standard to TEST PORT2.



㉚-1 **AVG,** ***AVG RESTART***

㉛ When the average count (shown in the upper left corner of the screen) reaches 64, read the isolation value using the marker.

VERIFY Isolation from TEST PORT3 to TEST PORT2

40MHz to 2.6GHz –85dB or less
2.6GHz to 3.8GHz –80dB or less
3.8GHz to 5.0GHz –65dB or less
5.0GHz to 8.0GHz –55dB or less

7 SPECIFICATIONS

7.1 Specifications of R3965A/B

Item	R3965A/B
Directivity (25°C ±5°C)	–30dB typical *–40dB typical (40MHz to 2.6GHz) –29dB typical *–32dB typical (2.6GHz to 3.8GHz) –25dB typical *–26dB typical (3.8GHz to 8.0GHz) * :When 2PORT FULL CAL is performed
Test port load match (25°C ±5°C)	–25dB typical *–40dB typical (40MHz to 2.6GHz) –20dB typical *–32dB typical (2.6GHz to 3.8GHz) –14dB typical *–26dB typical (3.8GHz to 8.0GHz) *: When 2PORT FULL CAL is performed
Frequency characteristics Transmission magnitude TEST PORT1 to TEST PORT2 {A(P1-P2)} TEST PORT1 to TEST PORT3 {B(P1-P3)} TEST PORT2 to TEST PORT3 {C(P2-P3)} Reflection magnitude TEST PORT1 {A(P1-P2)} TEST PORT2 {A(P1-2), C(P2-3) } TEST PORT3 {B(P1-3)}	 4dB p-p typical 4dB p-p typical 4dB p-p typical 6dB p-p typical 6dB p-p typical 6dB p-p typical
Insertion loss INPUT to TEST PORT1 {A(P1-2), B(P1-3) } INPUT to TEST PORT2 {A(P1-2), C(P2-3) } INPUT to TEST PORT3 {B(P1-3), C(P2-3) } TEST PORT1 to A PORT {A(P1-2), B(P1-3) } TEST PORT2 to A PORT {C(P2-3)} TEST PORT2 to B PORT {A(P1-2)} TEST PORT3 to B PORT {B(P1-3), C(P2-3) }	 –11dB typical –14dB typical –14dB typical –22dB typical –25dB typical –25dB typical –22dB typical

Item	R3965A/B
Isolation TEST PORT1 to TEST PORT2	–85dB or less (40MHz to 2.6GHz) –80dB or less (2.6GHz to 3.8GHz) –65dB or less (3.8GHz to 5.0GHz) –55dB or less (5.0GHz to 8.0GHz)
TEST PORT1 to TEST PORT3	–85dB or less (40MHz to 2.6GHz) –80dB or less (2.6GHz to 3.8GHz) –65dB or less (3.8GHz to 5.0GHz) –55dB or less (5.0GHz to 8.0GHz)
TEST PORT2 to TEST PORT3	–85dB or less (40MHz to 2.6GHz) –80dB or less (2.6GHz to 3.8GHz) –65dB or less (3.8GHz to 5.0GHz) –55dB or less (5.0GHz to 8.0GHz)
Frequency range	40MHz to 8.0GHz
RF breakdown level	+20dBm max.
Environmental conditions	Temperature range: 0°C to +50°C Humidity range: 80% or lower (no condensation)
Storage temperature range	–20°C to +60°C
Programming	The R3765AH or R3767AH controls all functions. Shares the R3765AH or R3767AH GPIB interface for remote control.
Power supply	Powered by the R3765AH or R3767AH
Mass	5kg or less
External dimensions R3965A R3965B	Approximately 424 (W) × 88 (H) × 400 (D) mm Approximately 252 (W) × 88 (H) × 165 (D) mm

7.2 Specifications of R3966A/B

Item	R3966A/B
Insertion loss PORT1 to TEST PORT1 {A(P1-P2), B(P1-P3) } PORT1 to TEST PORT2 {C(P2-P3)} PORT2 to TEST PORT2 {A(P1-P2)} PORT2 to TEST PORT3 {B(P1-P3), C(P2-P3) }	–4dB typical –6dB typical –6dB typical –4dB typical
Isolation TEST PORT1 to TEST PORT2 TEST PORT1 to TEST PORT3 TEST PORT2 to TEST PORT3	 –85dB or less (40MHz to 2.6GHz) –80dB or less (2.6GHz to 3.8GHz) –65dB or less (3.8GHz to 5.0GHz) –55dB or less (5.0GHz to 8.0GHz) –85dB or less (40MHz to 2.6GHz) –80dB or less (2.6GHz to 3.8GHz) –65dB or less (3.8GHz to 5.0GHz) –55dB or less (5.0GHz to 8.0GHz) –85dB or less (40MHz to 2.6GHz) –80dB or less (2.6GHz to 3.8GHz) –65dB or less (3.8GHz to 5.0GHz) –55dB or less (5.0GHz to 8.0GHz)
Frequency range	40MHz to 8.0GHz
RF breakdown level	+20dBm max.
Environmental conditions	Temperature range: 0°C to +50°C Humidity range: 80% or lower (no condensation)
Storage temperature range	–20°C to +60°C
Programming	The R3765CH or R3767CH controls all functions. Shares the R3765CH or R3767CH GPIB interface for remote control.
Power supply	Powered by the R3765CH or R3767CH
Mass	5kg or less
External dimensions R3966A R3966B	Approximately 424 (W) × 88 (H) × 400 (D) mm Approximately 252 (W) × 88 (H) × 165 (D) mm

APPENDIX

A.1 MEAS Extension and Calibration Function Extension

When the instrument is connected to the R3765AH/CH or R3767AH/CH network analyzer, the following two functions are enabled:

- MEAS extension (test port switching in three-port mode)
- Calibration function extension TRIPLEX 2PORT CAL
  FULL 3PORT CAL

These two functions are described in this appendix.

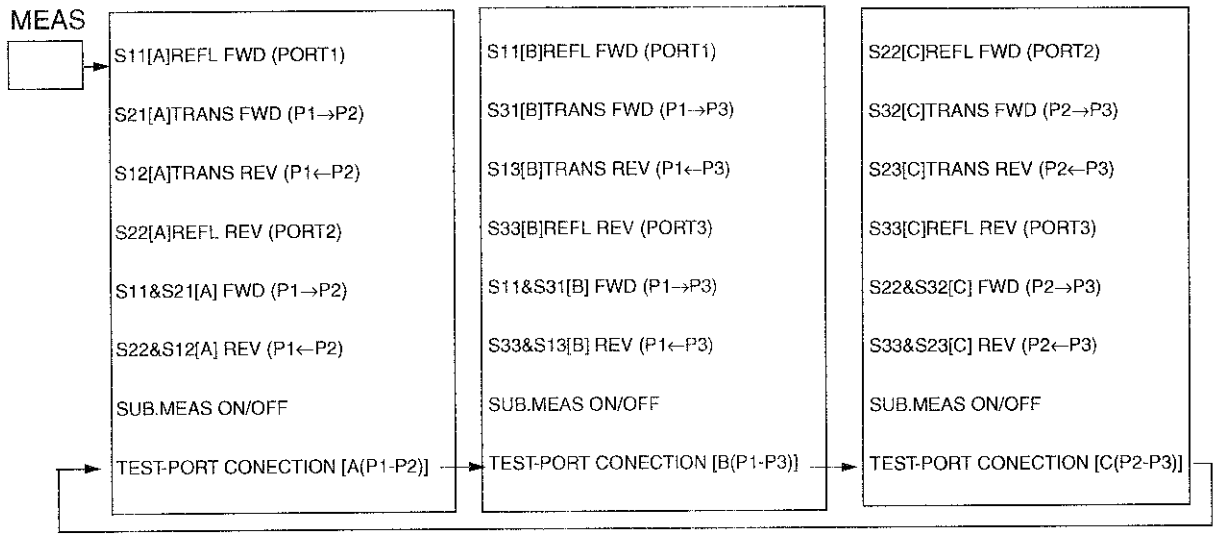
A.1.1 MEAS extension (test port switching in three-port mode)

MEAS→ ***S****
S*
⋮
S*
TEST-PORT/CONNECTION/*

S paramr selection menu
Measures the selected S parameter.

TEST PORT menu
Selects a system between measuring ports. Selects the PORT1 to PORT2, the PORT1 to PORT3, or the PORT2 to PORT3 setting. Selecting these systems automatically changes the S parameter selection menu.

List of MEAS soft key menus



A.1.2 Calibration function extension (TRIPLEX 2 PORT CAL / FULL 3 PORT CAL)

The TRIPLEX 2PORT CAL and FULL 3PORT CAL function enables you to execute a calibration when measuring multi-port devices using a test set.
As calibration data is operated according to the measurement item selected by MEAS, measurement can be performed regardless of the combination between the measurement system (ANT port, Tx port or Rx port) and the calibration data.

TRIPLEX 2PORT CAL →

PORT1 REFLECT'N	Displays the PORT1 Reflection Error Data Acquisition menu
PORT2 REFLECT'N	Displays the PORT2 Reflection Error Data Acquisition menu
PORT3 REFLECT'N	Displays the PORT3 Reflection Error Data Acquisition menu
TRANSMISSION	Displays the PORT1, 2, and 3 Transmission Error Data Acquisition menu
ISOLATION	Displays the Isolation Data Acquisition menu
DONE TRIPLEX 2-PORT	Executes TRIPLEX 2PORT CAL.

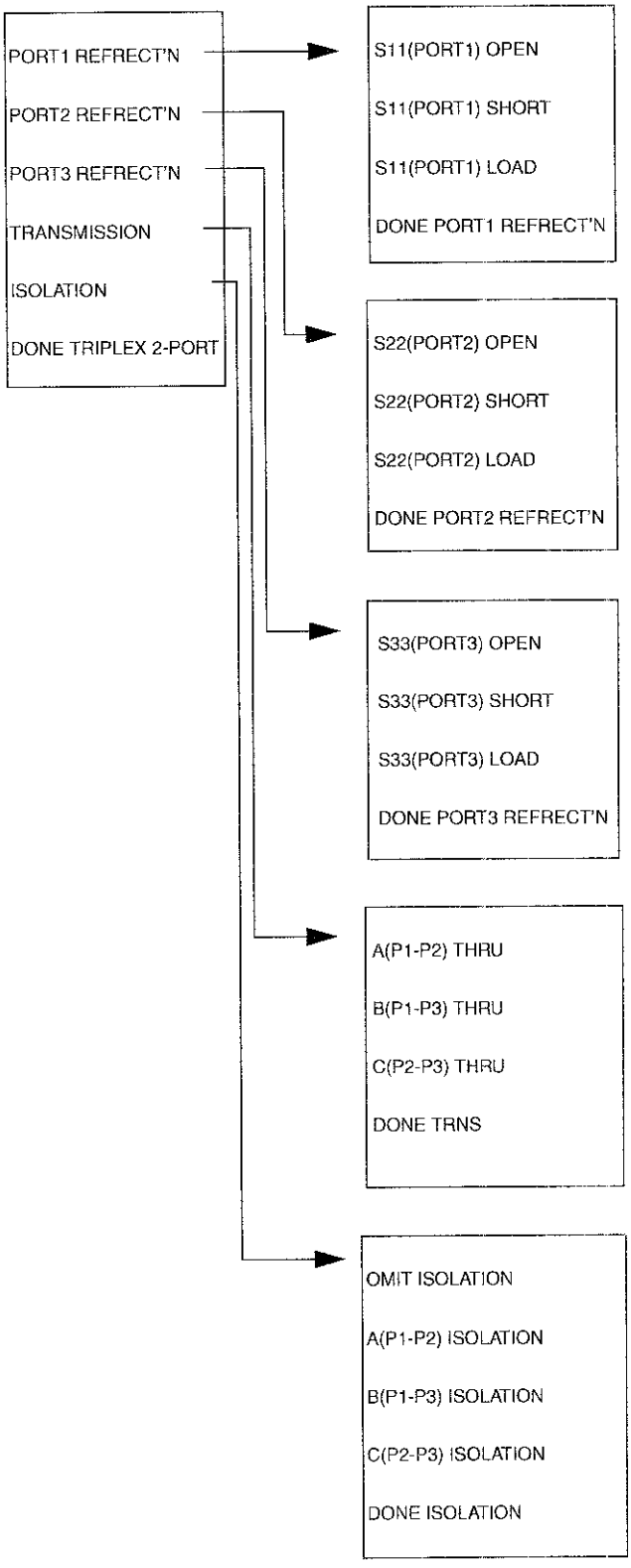
3PORT FULL CAL →

PORT1 REFLECT'N	Displays the PORT1 Reflection Error Data Acquisition menu
PORT2 REFLECT'N	Displays the PORT2 Reflection Error Data Acquisition menu
PORT3 REFLECT'N	Developed to the PORT3 Reflection Error Data Acquisition menu
TRANSMISSION	Displays the PORT1, 2, and 3 Transmission Error Data Acquisition menu
ISOLATION	Displays the Isolation Data Acquisition menu
DONE TRIPLEX 2-PORT	Executes FULL 3PORT CAL

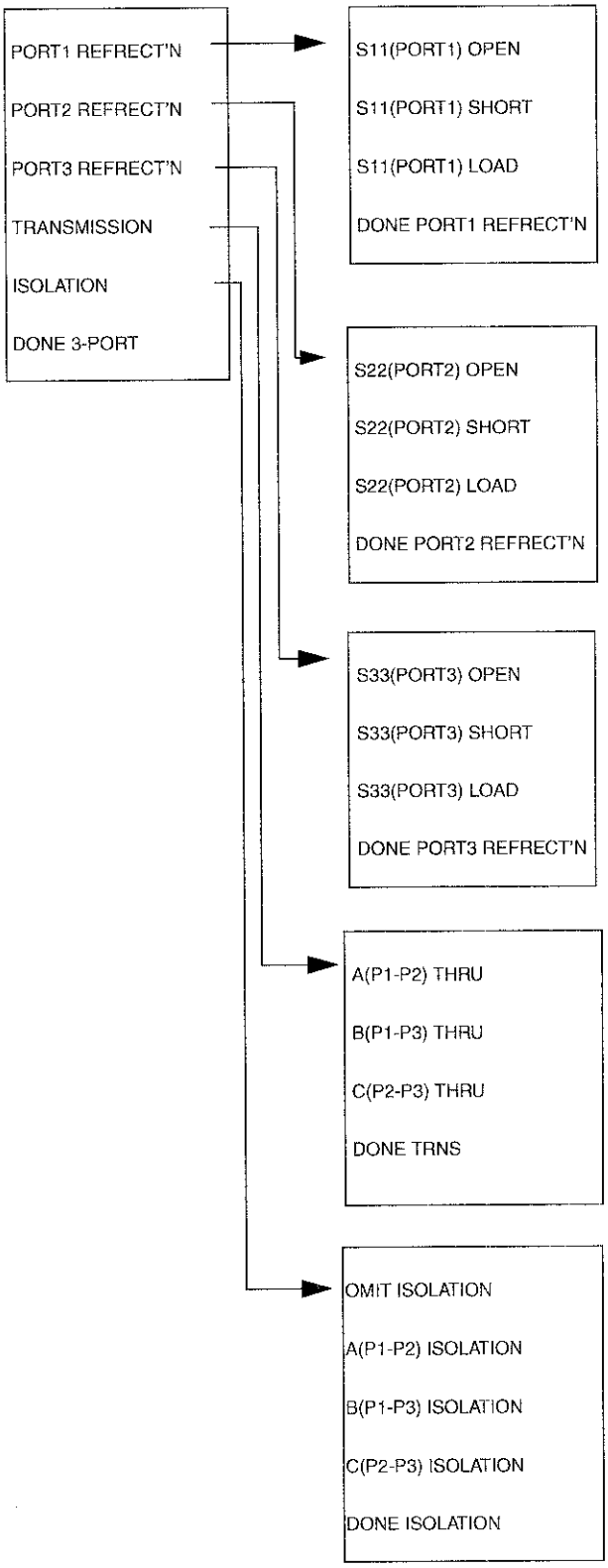
TRIPLEX 2PORT CAL simultaneously executes FULL 2PORT CAL for three combinations (PORT1 to PORT2, PORT1 to PORT3, and PORT2 to PORT3). As a result, when measuring PORT1 to PORT2, the reflection error from PORT3 cannot be removed because the error from PORT3 is not calibrated.
In the same way, the error of PORT2 is not calibrated when measuring PORT1 to PORT3, and the error of PORT1 is not calibrated when measuring PORT2 to PORT3.

As the FULL 3PORT CAL completely calibrates the three-port network, it calibrates the error of PORT3 even when measuring PORT1 to PORT2. As a result, it calibrates the error caused by the reflection from PORT3.
In the same way, the error of the PORT2 is calibrated when measuring PORT1 to PORT3, and the error of PORT1 is calibrated when measuring PORT2 to PORT3.
However, measurement is always executed in three directions when performing the FULL 3PORT CAL. As the FULL 3PORT CAL measures PORT1 to PORT3 and PORT2 to PORT3 while measuring PORT1 to PORT2, three times the FULL 2PORT CAL measurement time is required.

List of TRIPLEX 2PORT CAL soft key menus



List of FULL 3PORT CAL soft key menus



A.1.3 List of GPIB codes

(1) MEAS-related codes

[SENSe:]FUNCtion[<chno>]:POWer [SENSe:]FUNCtion[<chno>][:ON]

- Sets the Function MEAS mode and turns the SUB MEAS ON or OFF. (Command/Query)
- New commands

Commands [SENSe:]FUNCtion[ch]:POWer<input>
[SENSe:]FUNCtion[ch][:ON]<str>

Parameters <input> = {R|A|B|AR|BR|AB|BDC|BDCR|
S11[A]|S21[A]|S12[A]|SFWD[A]|SREV[A]|
S11B|S31B|S13B|S33B|SFWDB|SREVB|
S22C|S32C|S23C|S33C|SFWDC|SREVC|
NONE}

<str>= {"POWer:{AC|DC} {1|2|3}"|
"POWer:{AC|DC}:RATio{2,1|3,1|3,2}"|
"POWer:{S11[A]|S21[A]|S12[A]|S22[A]|SFWD[A]|SREV[A]|
S11B|S31B|S13B|S33B|SFWDB|SREVB|
S22C|S32C|S23C|S33C|SFWDC|SREVC}"|
"POWer:NONE"}

Response type R|A|B|AR|BR|AB|BDC|BDCR|S11|S21|S12|SFWD|SREV|
S11B|S31B|S13B|S33B|SFWDB|SREVB|
S22C|S32C|S23C|S33C|SFWDC|SREVC|
NONE

"POW:{AC|DC}{1|2|3}"|
"POW:{AC|DC}:RAT{2,1|3,1|3,2}"|
"POW:{S11|S21|S12|S22|SFWD|SREV|
S11B|S31B|S13B|S33B|SFWDB|SREVB|
S22C|S32C|S23C|S33C|SFWDC|SREVC}"|
"POW:NONE"

- Previous commands

  Commands {RIAIBIARIBRIABIBDCIBDCR}IN,
  S11[A],S21[A],S12[A],S22[A],SFWD[A],SREV[A],
  S11B,S31B,S13B,S33B,SFWDB,SREVB,
  S22C,S32C,S23C,S33C,SFWDC,SREVC

  SMEAS<bool>

  Response type 0|1

- Description See Table A-1.

- CAUTION When S11A to SREVC are set and as a result the switching of the test ports (A, B, and C) is necessary, the correspondent Main or Sub MEAS setting is used with the same port connection.
  However, the channel MEAS setting used will be the previous MEAS setting for that port.

Table A-1 Relationship between the New and Previous MEAS Commands

Previous command	New command		Operation (input port)
	<input>	<str>	
S11A	S11A	"POW:S11A"	Sets S11[A]. (TEST PORT connection A)
S21A	S21A	"POW:S21A"	Sets S21[A]. (TEST PORT connection A)
S12A	S12A	"POW:S12A"	Sets S12[A]. (TEST PORT connection A)
S22A	S22A	"POW:S22A"	Sets S22[A]. (TEST PORT connection A)
SFWDA	SFWDA	"POW:SFWDA"	Sets S21&S21[A]. (TEST PORT connection A)
SREVA	SREVA	"POW:SREVA"	Sets S22&S12[A]. (TEST PORT connection A)
S11B	S11B	"POW:S11B"	Sets S11[B]. (TEST PORT connection B)
S31B	S31B	"POW:S31B"	Sets S31[B]. (TEST PORT connection B)
S13B	S13B	"POW:S13B"	Sets S13[B]. (TEST PORT connection B)
S33B	S33B	"POW:S33B"	Sets S33[B]. (TEST PORT connection B)
SFWDB	SFWDB	"POW:SFWDB"	Sets S11&S31[B]. (TEST PORT connection B)
SREVB	SREVB	"POW:SREVB"	Sets S33&S13[B]. (TEST PORT connection B)
S22C	S22C	"POW:S22C"	Sets S22[C]. (TEST PORT connection C)
S32C	S32C	"POW:S32C"	Sets S32[C]. (TEST PORT connection C)
S23C	S23C	"POW:S23C"	Sets S23[C]. (TEST PORT connection C)
S33C	S33C	"POW:S33C"	Sets S33[C]. (TEST PORT connection C)
SFWDC	SFWDC	"POW:SFWDC"	Sets S22&S32[C]. (TEST PORT connection C)
SREVC	SREVC	"POW:SREVC"	Sets S33&S23[C]. (TEST PORT connection C)

(2) CAL-related commands

Note ***<port> : 1; PORT1***
2;PORT2
3;PORT3

<eport>: 1;R channel
2;A channel
3;B channel
4;PORT1
5;PORT2
6;PORT3

1. [SENSe:]CORRection[<chno>]:COLLect:METHod

- Function — Sets the CAL method (type).
- Presence of command and query — Command/Query
- New command

  Command — [SENSe:]CORRection[<chno>]:COLLect:METHod<type>

  Parameter — <type>= {NORMalize|SNORmalize|F1Port|NISolation|F2Port|D2Port|T2Port|F3Port}

  Response type — NONE|NORM|SNOR|F1P|NIS|F2P|D2P|T2P|F3P

- Previous command

  Command — CAL{NONE|NORM|SNOR|F1P|NIS|F2P|D2P|T2P|F3P} (CALNONE is only for Query.)

  Response type — 0|1

- Description — This command sets the CAL method in advance (see Table A-2) before the CORR:COLL[:ACQ]STAN<n> or STAN{1|2|_c} is used.

- CAUTION — When CORR:CSET:STAT or CORRECT is ON, this command cannot be set. Also, if another type is specified when the CAL has been obtained, the obtained data will be lost (same as CORR:COLL:DEL).

  The set value will be retained until the PRESET, *RST, RECALL or LOAD command is used. (executed or reset).

  When a <type> unavailable for the instrument is specified, an error occurs.

  In Query, the currently used CAL type is returned even if the calibration has not been completed (ie. not in DONE status).

  When CORR:COLL:DEL or CLEAR is executed, NONE is automatically set.

2. [SENSe:]CORRection[<chno>]:COLLect[:ACQuire]<standard>

- Function — Acquires the CAL (Calibration) data.
- Presence of command and query
  Command
- New command

  Command — [SENSe:]CORRection[<chno>]:COLLect[:ACQuire]<standard>

  Parameter — <standard>= {NORMalize|SNORmalize|····|STANdard<n>}

- Previous command

  Command — STAN{1|2|3|4|5|6|7|8|9|10|11|12|13|14|15|16}

- CAUTION — When using CORR:COLL STAN<n> or STAN{1|2|_c}, it is necessary to set the CAL mode in advance using CORR:COLL:METH<type> or CAL{NORM|SNOR|F1P|F2P|_c} (see Table A-2).

  When CORR:COLL:METH? Is NONE, or CALNONE is 1, the result of CORR:COLL STAN<n> and STAN{1|2|_c} will be invalid.

Table A-2 Relationship between the Panel Menu and the STAN Command

Panel menu	Corresponding GPIB command	Remarks
NORMALIZE (THRU)	CORR:COLL:METH NORM CORR:COLL STAN1;*WAI	Same as CORR:COLL NORM Same as CORR:COLL NORM
NORMALIZE (SHORT)	CORR:COLL:METH SNOR CORR:COLL STAN1;*WAI	Same as CORR:COLL SNOR Same as CORR:COLL SNOR
1 PORT FULL CAL OPEN SHORT LOAD DONE 1-PORT	CORR:COLL:METH F1P CORR:COLL STAN1;*WAI CORR:COLL STAN2;*WAI CORR:COLL STAN3;*WAI CORR:COLL:SAVE	 Same as CORR:COLL OPEN Same as CORR:COLL SHORT Same as CORR:COLL LOAD
NORMALIZE & ISOLATION THRU ISOLATION DONE NORM & ISO	CORR:COLL:METH NIS CORR:COLL STAN1;*WAI CORR:COLL STAN2;*WAI CORR:COLL:SAVE	 Same as CORR:COLL THRU Same as CORR:COLL ISOL
2 PORT FULL CALL FWD:OPEN FWD:SHORT FWD:LOAD REV:OPEN REV:SHORT REV:LOAD FWD.TRANS THRU FWD.MATCH THRU REV.TRANS THRU REV.MATCH THRU GROUP THRU OMIT ISOLATION FWD.ISOLATION REV.ISOLATION DONE 2-PORT	CORR:COLL:METH F2P CORR:COLL STAN1;*WAI CORR:COLL STAN2;*WAI CORR:COLL STAN3;*WAI CORR:COLL STAN4;*WAI CORR:COLL STAN5;*WAI CORR:COLL STAN6;*WAI CORR:COLL STAN7;*WAI CORR:COLL STAN8;*WAI CORR:COLL STAN9;*WAI CORR:COLL STAN10;*WAI CORR:COLL STAN11;*WAI CORR:COLL STAN12;*WAI CORR:COLL STAN13;*WAI CORR:COLL STAN14;*WAI CORR:COLL:SAVE	 Same as CORR:COLL S11O Same as CORR:COLL S11S Same as CORR:COLL S11L Same as CORR:COLL S22O Same as CORR:COLL S22S Same as CORR:COLL S22L Same as CORR:COLL FTR Same as CORR:COLL FMAT Same as CORR:COLL RTR Same as CORR:COLL RMAT Same as CORR:COLL GTHR Same as CORR:COLL OIS Same as CORR:COLL FIS Same as CORR:COLL RIS
DUPLEX 2 PORT CALL TRIPLEX 2 PORT CALL 3 PORT FULL CALL	CORR:COLL:METH D2P CORR:COLL:METH T2P CORR:COLL:METH F3P	
S11(PORT1)OPEN S11(PORT1)SHORT S11(PORT1)LOAD S22(PORT2)OPEN S22(PORT2)SHORT S22(PORT2)LOAD S33(PORT3)OPEN S33(PORT3)SHORT S33(PORT3)LOAD A(P1-P2) THRU B(P1-P3) THRU C(P2-P3) THRU OMIT ISOLATION A(P1-P2) ISOLATION B(P1-P3) ISOLATION C(P2-P3) ISOLATION DONE xxx	CORR:COLL STAN1;*WAI CORR:COLL STAN2;*WAI CORR:COLL STAN3;*WAI CORR:COLL STAN4;*WAI CORR:COLL STAN5;*WAI CORR:COLL STAN6;*WAI CORR:COLL STAN7;*WAI CORR:COLL STAN8;*WAI CORR:COLL STAN9;*WAI CORR:COLL STAN10;*WAI CORR:COLL STAN11;*WAI CORR:COLL STAN12;*WAI CORR:COLL STAN13;*WAI CORR:COLL STAN14;*WAI CORR:COLL STAN15;*WAI CORR:COLL STAN16;*WAI CORR:COLL:SAVE	 Invalid when DUPLEX 2 PORT Invalid when DUPLEX 2 PORT DUPLEX,TRIPLEX,3-PORT

3. [SENSe:]CORRection[<chno>]:CKIT:TERMinal[<port>]

- Function — Sets the male or female of the test port connector.
- Presence of command and query
  Command/Query
- New command

Command	[SENSe:]CORRection[<chno>]:CKIT:TERMinal[<port>]<type>
Parameter	<type> = {FEMale|MALe}
Response type	FEM|MAL

- Previous command

Command	PORT{1|2|3}{FEM|MAL}
Response type	0|1

- Description — Switches between the male and female settings of the test port connector when setting the CAL KIT for calibration.
- CAUTION — Sets the male or female for the test port, not for the CAL KIT.

  Sets the connector type of the CAL KIT using CORR:CKIT[:TYPE]<int> or CKIT{0\|1\|2\|3\|4\|5}.

4. [SENSe:]CORRection[<chno>]:CKIT[:TYPE]

- Function — Sets the CAL kit connector type.
- Presence of command and query
  Command/Query
- New command

Command	[SENSe:]CORRection[<chno>]:CKIT[:TYPE]<int>
Parameter	<int>
Response type	NR1 (Integer number)

- Previous command

Command	CKIT{0|1|2|3|4|5}
Response type	0|1

- Description — Sets the CAL Kit connector type used when setting the CAL kit for calibration.

Previous command	New command parameter	Connector type
CKIT0	0	Don't care
CKIT1	1	N type (50Ω) (male or female)
CKIT2	2	N type (75Ω) (male or female)
CKIT3	3	3.5mm (male or female)
CKIT4	4	7mm
CKIT5	5	User defines

- CAUTION — The CORR:CKIT:TERM {FEM|MAL} or PORT{1|2|3}{FEM|MAL} sets the male or female setting for the connector.

5. [SENSe:]CORRection[<chno>]:PEXTension:TIME[<eport>]

- Function — Setting correction value of reference plane extension
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:PEXTension:TIME[<eport>] <real>
- Previous command — EPORT{R|A|B|1|2|3}<real>
- Parameter — <real>
- Response type — NR3 (real value)
- Description — Sets the value of the reference plane extension.

  The command corrects the extension in accordance with the input port. While the electrical length correction simply corrects the set value, this command corrects in accordance with input conditions by setting the value corresponding to the input port.

  For example, the command automatically sets the correction value to two times the port extension value for reflection measurements, and one time the port extension value for transfer measurements.

6. [SENSe:]Correction[<chno>]:SLOPe:PHASe

- Function — Sets Phase slope.
- Presence of command and query — Command/Query
- New command — [SENSe:]Correction[<chno>]:SLOPe:PHASe<real>
- Previous command — PHASLO<real>
- Parameter — <real>
- Response type — NR3 (Real number)
- Description — Sets the Phase slope value (degree). Adds a phase slope value to the phase data so that the starting point is 0° and the ending point is the specified phase value. This slope is not related to frequencies and is linearly calculated at the points.

7. [SENSe:]CORRection[<chno>]:CKIT:DEFine:SAVE

- Function — Saves the set STD value in USER-DEFINE.
- Presence of command and query — Command
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:SAVE
- Previous command — STDSAVE
- Description — Saves (registers) each STD value set by CORR: CKIT:DEF: STN··· or STD{1|2|3}··· as USER-DEFINE.

8. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:OCAPacitance[<n>]

- Function — Sets the open capacitance of the open standard.
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]: OCAPacitance[<n>]<real>
- Previous command — STD{1|2|3}C{0|1|2|3}<real>

- Parameter <real>
- Response type NR3 (Real number)
- Description Sets open capacitance of the open standard (CAL kit).

Previous command	New command<n>	Setting range
STD{1|2|3}C0	0	±10k (10^ - 15F)
STD{1|2|3}C1	1	±10k (10^ - 27F/Hz)
STD{1|2|3}C2	2	±10k (10^ - 36F/Hz^2)
STD{1|2|3}C3	3	±10k (10^ - 45F/Hz^3)

- CAUTION When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

9. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:ODELay

- Function Sets the electrical length (time) of the open standard.
- Presence of command and query
  Command/Query
- New command [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:ODELay<real>
- Previous command STD{1|2|3}ODEL<real>
- Parameter <real>
- Response type NR3 (Real number)
- Description Sets the electrical length of the open standard (CAL kit) in time.
- CAUTION When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

10. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:OLOSs

- Function — Sets the loss of the open standard.
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:OLOSs<real>
- Previous command — STD{1|2|3}OLOS<real>
- Parameter — <real>
- Response type — NR3 (Real number)
- Description — Sets the loss (Ω/sec) of the open standard (CAL kit).
- CAUTION — When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

11. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:OIMPedance

- Function — Sets the impedance (Z0) of the open standard.
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:OIMPedance<real>
- Previous command — STD{1|2|3}OIMP<real>
- Parameter — <real>
- Response type — NR3 (Real number)
- Description — Sets the impedance (Z0) of the open standard (CAL kit).
- CAUTION — When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

12. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:SDELay

- Function — Sets the electrical length (time) of the short standard.
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:SDELay<real>
- Previous command — STD{1|2|3}SDEL<real>
- Parameter — <real>
- Response type — NR3 (Real number)
- Description — Sets the electrical length of the short standard (CAL kit) in time.
- CAUTION — When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

13. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:SLOSs

- Function — Sets the loss of the short standard.
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:SLOSs<real>
- Previous command — STD{1|2|3}SLOS<real>
- Parameter — <real>
- Response type — NR3 (Real number)
- Description — Sets the loss (/sec) of the short standard (CAL kit).
- CAUTION — When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

14. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:SIMPedance

- Function — Sets the impedance (Z0) of the short standard.
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:SIMPedance<real>
- Previous command — STD{1|2|3}SIMP<real>
- Parameter — <real>
- Response type — NR3 (Real number)
- Description — Sets the impedance (Z0) of the short standard (CAL kit).
- CAUTION — When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

15. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:TDELay

- Function — Sets the electrical length (time) of the thru standard.
- Presence of command and query — Command/Query
- New command — [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:TDELay<real>
- Previous command — STD{1|2|3}TDEL<real>
- Parameter — <real>
- Response type — NR3 (Real number)
- Description — Sets the electrical length of the thru standard (CAL kit) in time.

Previous command	New command<port>	Corresponding port
STD1TDEL	1	Between PORT1 and PORT2
STD2TDEL	2	Between PORT1 and PORT3
STD3TDEL	3	Between PORT2 and PORT3

- CAUTION When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

16. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:TLOSs

- Function Sets the loss of the thru standard.
- Presence of command and query
  Command/Query
- New command [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:TLOSs<real>
- Previous command STD{1|2|3}TLOS<real>
- Parameter <real>
- Response type NR3 (Real number)
- Description Sets the loss (Ω/sec) of the thru standard (CAL kit).

Previous command	New command<port>	Corresponding port
STD1TLOS	1	Between PORT1 and PORT2
STD2TLOS	2	Between PORT1 and PORT3
STD3TLOS	3	Between PORT2 and PORT3

- CAUTION When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

17. [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:TIMPedance

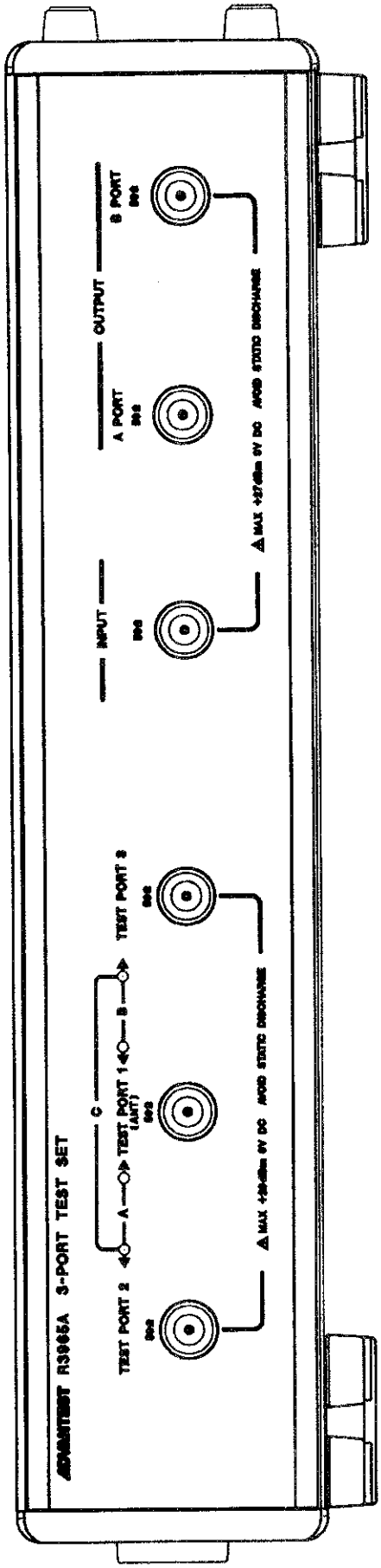
- Function Sets the impedance (Z0) of the thru standard.
- Presence of command and query
  Command/Query
- New command [SENSe:]CORRection[<chno>]:CKIT:DEFine:STANdard[<port>]:TIMPedance<real>
- Previous command STD{1|2|3}TIMP<real>
- Parameter <real>
- Response type NR3 (Real number)

- Description — Sets the impedance (Z0) of the thru standard (CAL kit).

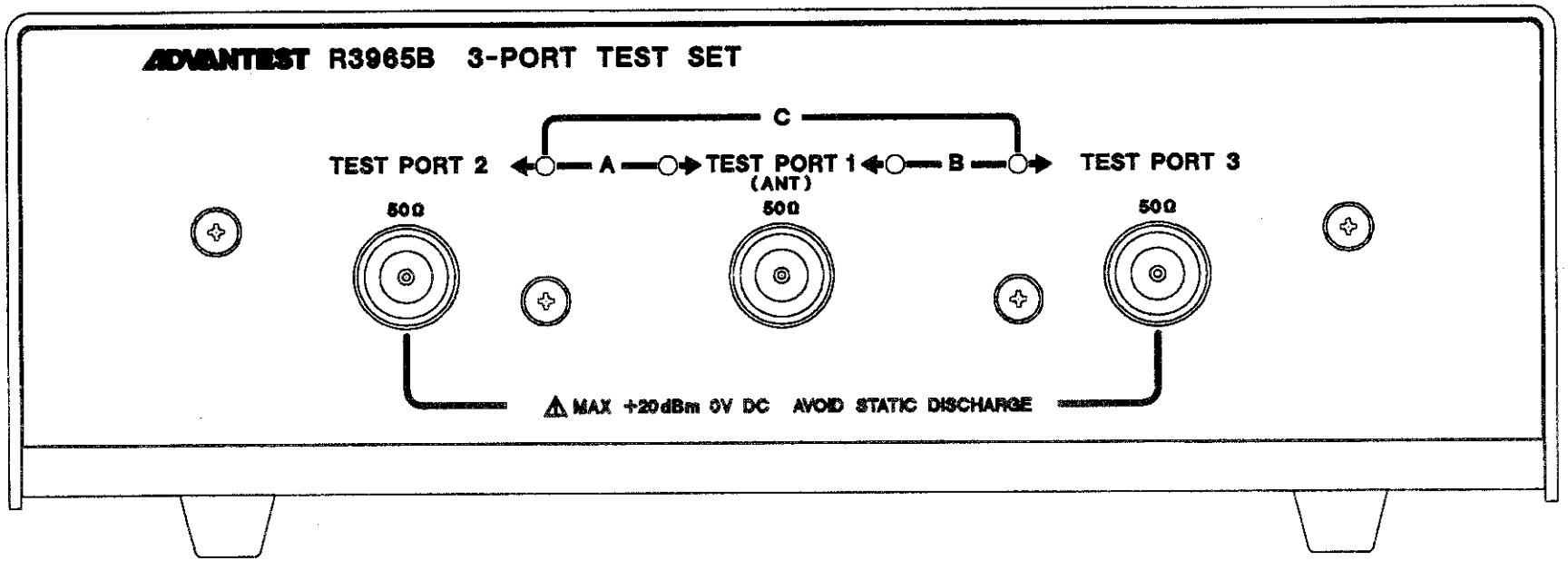
Previous command	New command<port>	Corresponding port
STD1TIMP	1	Between PORT1 and PORT2
STD2TIMP	2	Between PORT1 and PORT3
STD3TIMP	3	Between PORT2 and PORT3

- CAUTION — When the following operation is executed without performing CORR:CKIT:DEF:SAVE or STDSAVE after a setting has been made, the set value will be lost.

EXTERNAL VIEWS

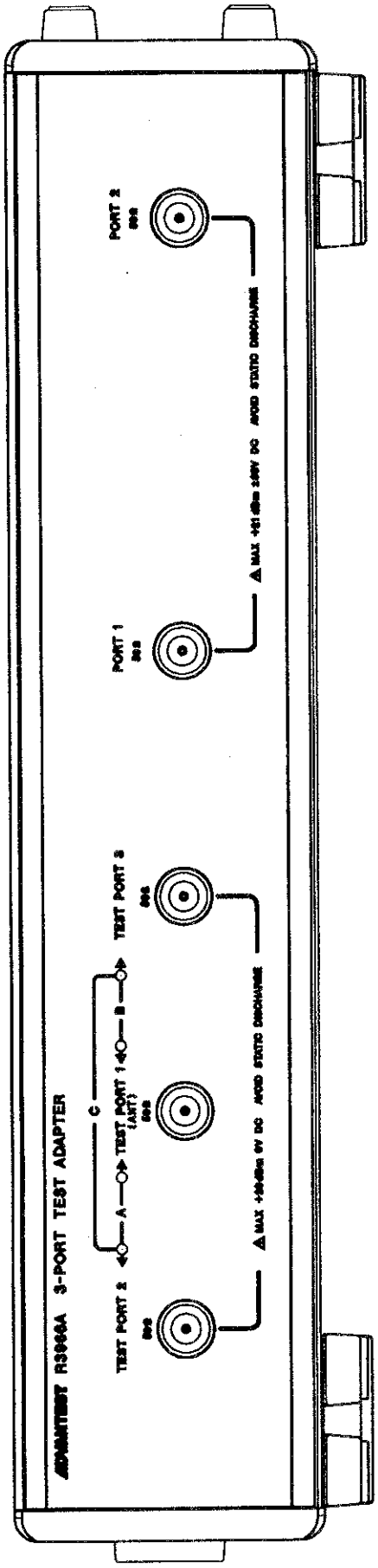


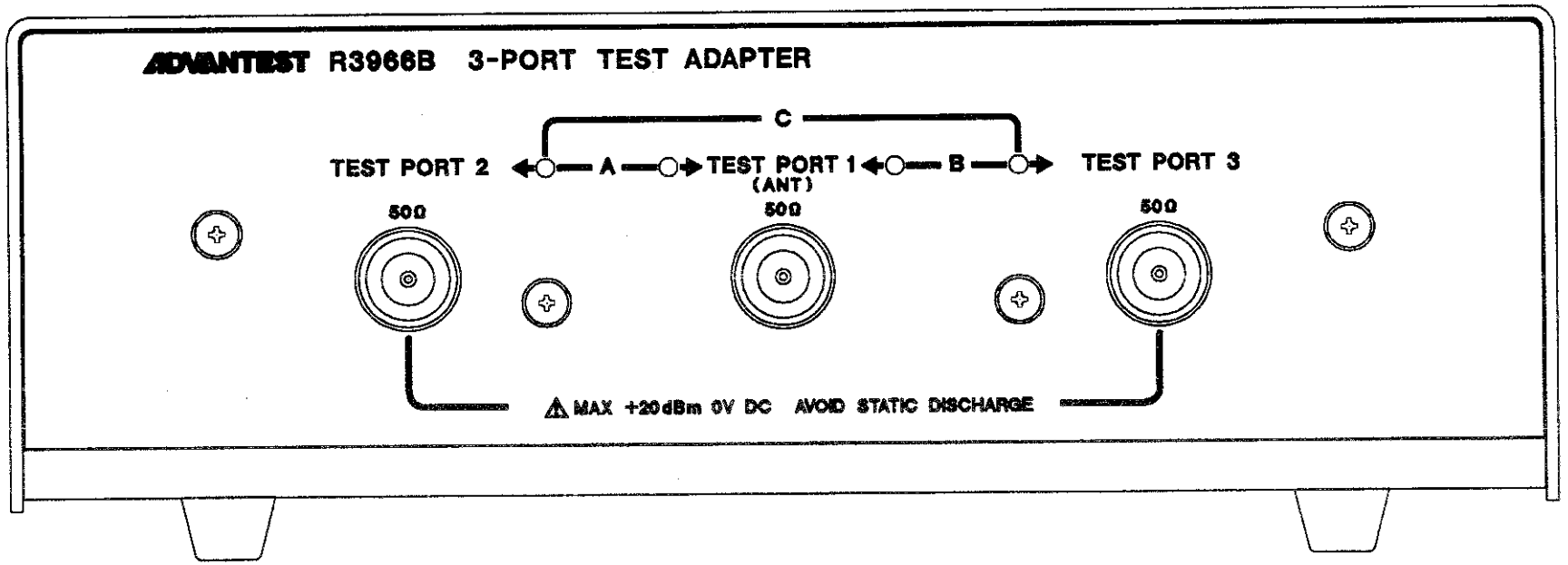
R3965A FRONT VIEW



R3965B FRONT VIEW

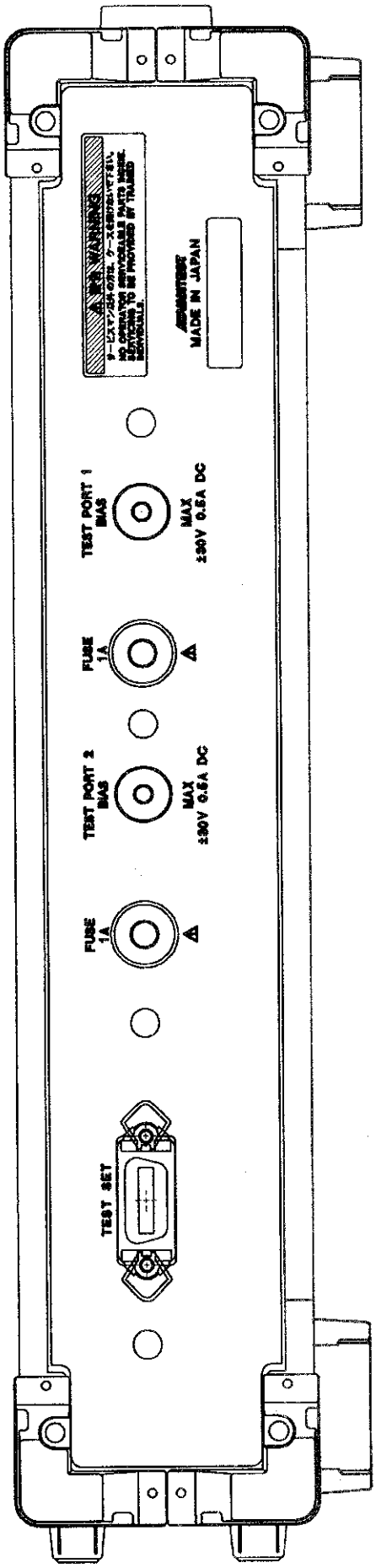
R3966A FRONT VIEW

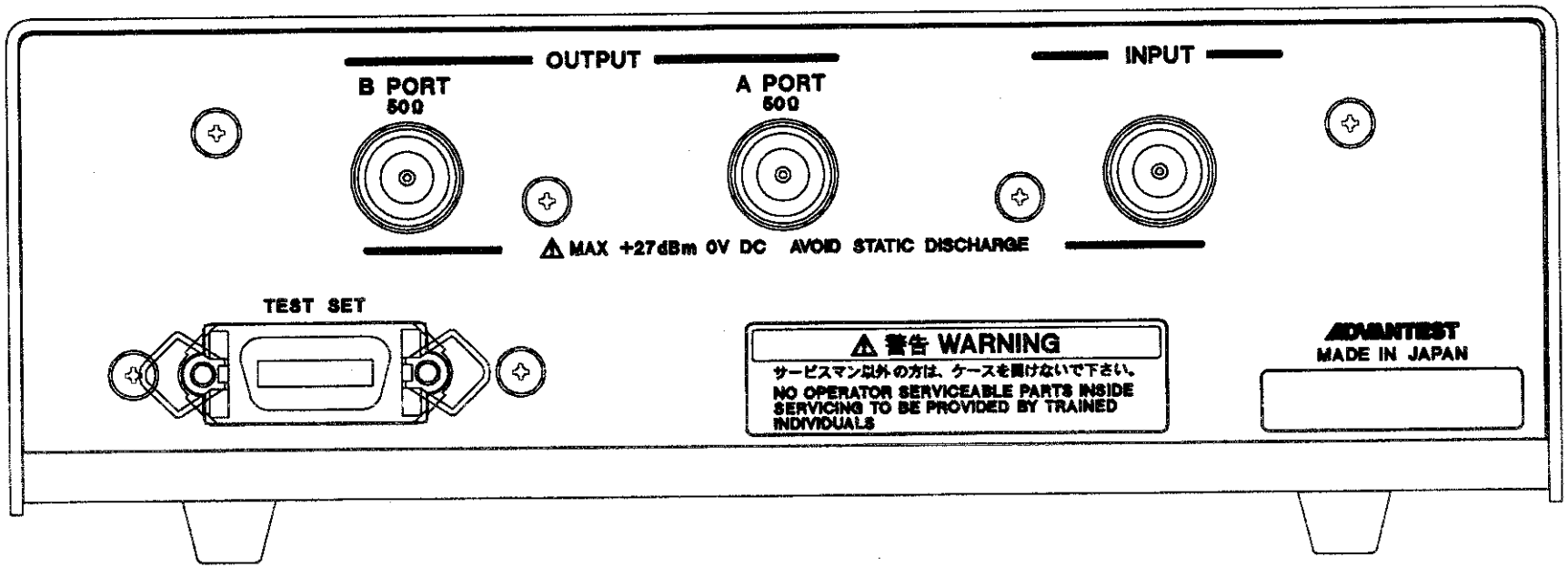




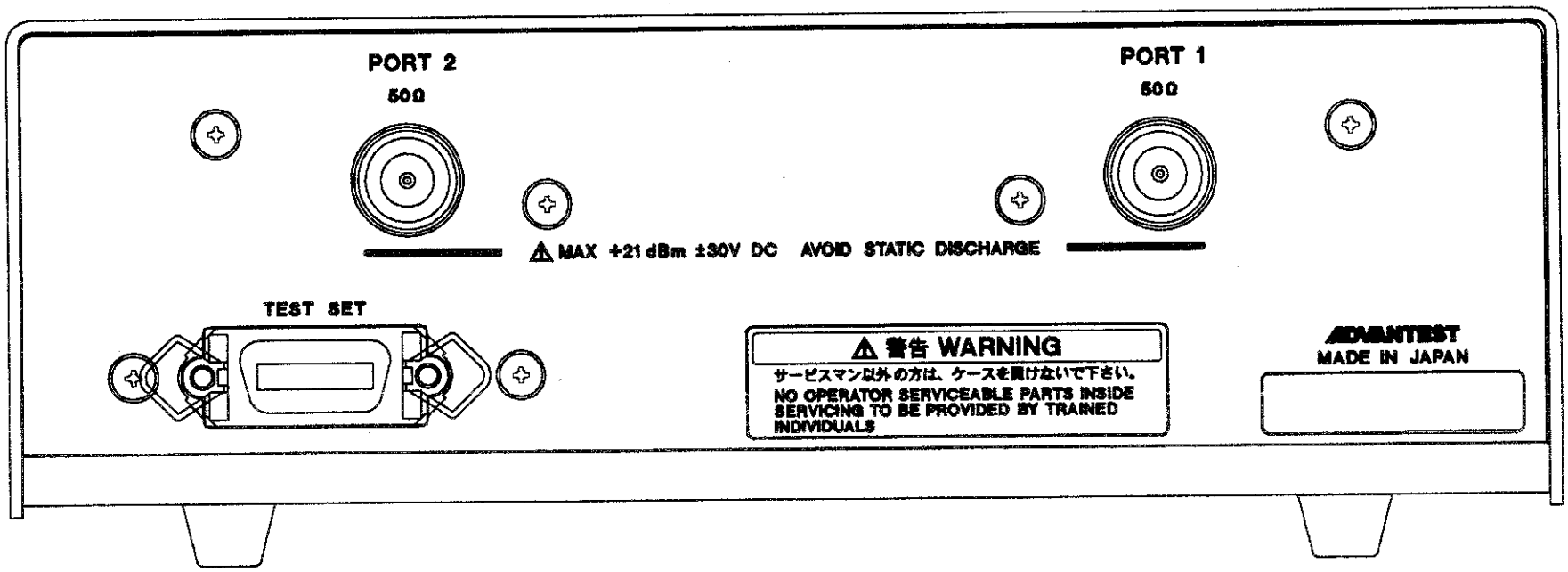
R3966B FRONT VIEW

R3965A/66A REAR VIEW





R3965B REAR VIEW



R3966B REAR VIEW

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