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Agilent 87512A/B TRANSMISSION/REFLECTION TEST KIT OPERATION AND SERVICE MANUAL

SERIAL NUMBERS

This manual applies directly to instruments with serial number prefix 3244J.

For additional important information about serial numbers, read

“INSTRUMENT COVERED BY MANUAL” in Chapter 1.



Agilent Technologies

Agilent Part No. 87512-90020
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Manual Printing History

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Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific **WARNINGS** given elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument.

The Agilent Technologies assumes no liability for the customer's failure to comply with these requirements.

DO NOT Operate In An Explosive Atmosphere

Do not operate the instrument in the presence of flammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a safety hazard.

Keep Away From Live Circuits

Operating personnel must not remove the instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT Service Or Adjust Alone

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT Substitute Parts Or Modify Instrument

Because of the danger of introducing additional hazards, do not substitute parts or perform unauthorized modifications to the instrument. Return the instrument to a Agilent Technologies Sales and Service Office for service and repair to ensure the safety features are maintained.

Dangerous Procedure Warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

Warning



Dangerous voltages, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.

Typeface Conventions

Bold

Boldface type is used when a term is defined. For example: **icons** are symbols.

Italics


Italic type is used for emphasis and for titles of manuals and other publications.

Italic type is also used for keyboard entries when a name or a variable must be typed in place of the words in italics. For example: `copy filename` means to type the word `copy`, to type a space, and then to type the name of a file such as `file1`.


Computer

Computer font is used for on-screen prompts and messages.

HARDKEYS

Labeled keys on the instrument front panel are enclosed in .

SOFTKEYS

Softkeys located to the right of the CRT are enclosed in .

Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent Technologies further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility, or to the calibration facilities of other International Standards Organization members.

Warranty

Agilent Technologies instrument product is warranted against defects in material and workmanship for a period of one year from the date of shipment, except that in the case of certain components listed in Chapter 1 of this manual, the warranty shall be for the specified period. During the warranty period, Agilent Technologies will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by Agilent Technologies. The Buyer shall prepay shipping charges to Agilent Technologies and Agilent Technologies shall pay shipping charges to return the product to the Buyer. However, The Buyer shall pay all shipping charges, duties, and taxes for products returned to Agilent Technologies from another country.

Agilent Technologies warrants that its software and firmware designated by Agilent Technologies for use with an instrument will execute its programming instruction when properly installed on that instrument. Agilent Technologies does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

Limitation Of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

No other warranty is expressed or implied. Agilent Technologies specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

Exclusive Remedies

The remedies provided herein are buyer's sole and exclusive remedies. Agilent Technologies shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Assistance

Product maintenance agreements and other customer assistance agreements are available for Agilent Technologies products.

For any assistance, contact your nearest Agilent Technologies Sales and Service Office. Address are provided at the back of this manual.

Safety Symbols

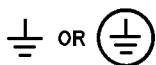
General definitions of safety symbols used on equipment or in manuals.



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect against damage to the instrument.



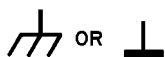
Indicates dangerous voltage (terminals fed from the interior by voltage exceeding 1000 volts must be so marked).



Protective conductor terminal. For protection against electrical shock in case of a fault. Used with wiring terminals to indicate the terminal which must be connected to ground before operating equipment.



Low-noise or noiseless, clean ground (earth) terminal. Used for a signal common, as well as providing protection against electrical shock in case of fault. A terminal marked with this symbol must be connected to ground in the manner described in the installation (Operation) manual, and before operating the equipment.



Frame or chassis terminal. A connection to the frame (chassis) of the equipment which normally includes all exposed metal structures.



Alternating current (power line).



Direct current (power line).



Alternating or direct current (power line).

Warning



Warning denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death to personnel.

Caution



Caution sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

Note



Note denotes important information. It calls attention to a procedure, practice, condition or the like, which is essential to highlight.

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General Information

INTRODUCTION

The purpose of this manual is to enable you to use your 87512A or 87512B transmission/reflection test kit efficiently and confidently. This manual contains both general and specific information. When information applies to both the 87512A (the 50 Ω test kit) and the 87512B (the 75 Ω test kit) the name 87512A/B will be used. To use the 87512A/B to perform a specific function (without reading the entire manual), follow the directions in “USING THE 87512A/B”.

This chapter,

- (1) outlines how to begin using the 87512A/B as quickly as possible,
- (2) describes what instrument are covered by this manual,
- (3) describes the test kit itself,
- (4) mentions operating precautions, safety considerations and warranty restrictions,
- (5) lists the additional equipment required, and
- (6) defines and lists the required instrument specifications.

USING THE 87512A/B

The 87512A/B has been designed to operate specifically with the Agilent Technologies network analyzer.

- To install the instrument, turn to Chapter 2.
- To operate the instrument, turn to Chapter 3.
- To check the proper operation of the 87512A/B, see the Chapter 4.
- To troubleshoot the 87512A/B, turn to Chapter 5.

INSTRUMENTS COVERED BY MANUAL

You will find a two-part serial number inside the cover of the test kit carrying case. The first four digits and the letter are the serial number prefix. The last five digits are the sequential suffix which is unique to each test kit. The contents of this manual apply directly to test kits with the same serial number prefix as the one(s) on the title page under the heading SERIAL NUMBERS.

If the serial prefix of your test kit is not listed on the title page, your instrument differs from those documented in this manual. The differences are documented in the yellow manual changes supplement supplied with the manual.

To keep this manual as current and accurate as possible, Agilent Technologies recommends that you periodically request the latest manual changes supplement, as it may contain replacement information as well as change information. The supplement for this manual is keyed to the manual's print date and part number (on the title page) and is available on request from Agilent Technologies.

This manual is also available on microfiche form (the part number appears on the title page). With the manual (in 4 × 6 inch microfilm transparency format) you will also receive the latest manual changes supplement.

DESCRIPTION AND OPERATING CHARACTERISTICS OF THE INSTRUMENT

The 87512A/B transmission/reflection test kit has been designed to operate with the Agilent Technologies network analyzer. The test kit provides a convenient means of measuring the reflection and transmission characteristics of a 50Ω or 75Ω device in one direction. The frequency range of the 87512A/B is dc to 2 GHz.

“SPECIFICATIONS” lists the operating specifications and characteristics of the 87512A/B. The test kit is shown on the cover of this manual and is shown in Figure 3-1.

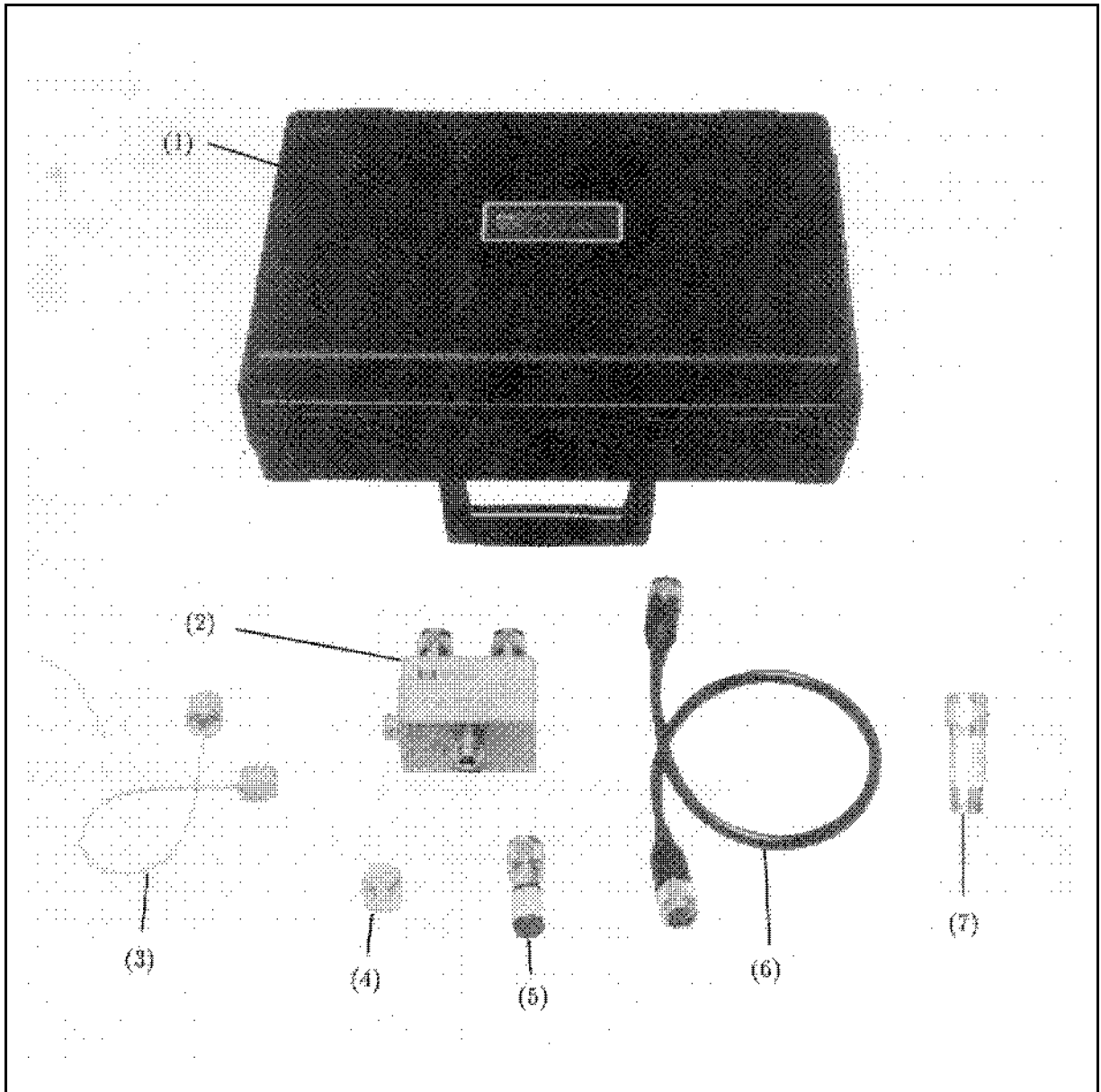


Figure 1-1. 87512A/B Transmission/reflection Test Kit with Accessories Supplied

No.	Description	Agilent Part Number		QTY
		87512A	87512B	
(1)	Carrying Case	87512-60011	87512-60012	1
(2)	Resistive Signal Divider	87512-61001	87512-61002	1
(3)	Semi-rigid cable	41952-61601	41952-61601	1
(4)	Precision SHORT Termination	11512A	85036-60012	1
(5)	Precision LOAD Termination	909C Opt. 012	909E	1
(6)	DUT Return Cable	8120-4666	8120-4666	1
(7)	Minimum Loss Pad, 50 Ω -75 Ω	Not furnished	11852B	1

ACCESSORIES

Accessories Supplied

Figure 1-1 shows the 87512A/B with the accessories supplied:

- Carrying case
- Semi-rigid cable
- Precision SHORT termination
- Precision LOAD termination
- Minimum loss pad (only for the 87512B)
- DUT return cable

Accessories Available

Calibration and Accessory Kits

The calibration kits listed in Table 1-1 contain the components required to characterize the systematic errors of various measurement systems. The calibration kits also contain precision adapters.

The accessory kits listed contain the components generally required to measure devices with the types of connectors indicated. Additional information is included in the analyzer's manual.

Table 1-1. Accessories Available

Connector Type	Calibration Kit	Accessory Kit
7 mm	85031B	N/A ¹
Type-N 50Ω	85032B	11853A ²
Type-N 75Ω	85036B	N/A ¹
BNC 50Ω	N/A ¹	11854A ²

1 not available

2 use with 85032B type-N 50Ω calibration kit

Cable Sets

Use the 11851B 50Ω type-N cable set to extend the test port of the 87512A. Use the 11857B 75Ω type-N test port return cable set to extend the test port of the 87512B.

OPERATING AND SAFETY PRECAUTIONS

Operating

You need to observe only normal precautions in handling and operating the 87512A/B. Do not exceed its operating input level of +23 dBm.

Caution



Electrostatic discharge (ESD) can damage the highly sensitive microcircuits in the 87512A/B test kits. ESD damage is most likely to occur when the test kits are connected or disconnected. Protect them by wearing a grounding strap that provides a path to ground of no less than 1 M Ω and no more than 2.5 M Ω . Alternatively, ground yourself by touching the outer shell of any grounded instrument chassis before touching the test port connectors.

Never touch the center contacts of the connectors.

Use a work station equipped with an anti-static surface.

Service

The voltages in this test kit do not warrant more than normal caution for operator safety. Nevertheless, service should be performed by qualified personnel.

RECOMMENDED TEST EQUIPMENT

Table 4-1 lists equipment and accessories required for operational verification and repairing the 87512A/B. The table notes which items are required to verify the performance of the test kit and which are required to troubleshoot it. Other equipment may be substituted if its specifications meet or exceed the specifications listed in the critical specifications column.

SPECIFICATIONS

Table 1-2 Specifications

Parameter	87512A	87512B
Nominal Impedance	50 Ω	75 Ω
Frequency Range	dc to 2 GHz	dc to 2 GHz
Operating Conditions		
Temperature	0°C to 55°C	0°C to 55°C
Relative Humidity	<95% at 40°C	<95% at 40°C
Dimensions	83 mm x 91 mm x 43 mm (3.3 x 3.6 x 1.7 inches)	83 mm x 91 mm x 43 mm (3.3 x 3.6 x 1.7 inches)
Weight	410 g	410 g

OPERATING CHARACTERISTICS

Definitions

The operating characteristics listed in Table 1-3 are those typical of most 87512A/B instruments but are not guaranteed.

Typical but non-warranted performance characteristics intended to provide information useful in applying the instrument. Operating characteristics are representative of most instruments, though not necessarily tested in each unit and not field tested.

Table 1-3. Operating Characteristics

Parameter	87512A	87512B
Insertion Loss ¹	10 \pm 1 dB	10 \pm 1 dB
Equivalent Directivity ^{1,2}	40 dB	40 dB
Equivalent Source Match ^{1,2}	30 dB @dc \leq frequency \leq 1 GHz 25 dB @1 GHz < frequency \leq 2 GHz	25 dB
Damage Level	+23 dBm	+23 dBm

1 23 \pm 5°C

2 after calibration with the furnished terminations

Installation

INTRODUCTION

This chapter explains how to install the 87512A/B test kit for use with the network analyzer. The topics covered include initial inspection, environmental considerations, positioning and connecting the test kit for use, and packaging the instrument.

INITIAL INSPECTION

Inspect the shipping container (including cushioning material) for damage. If it is damaged, keep it until you have checked the contents for completeness. The contents are listed in Table 2-1.

In addition, check the test kit mechanically and electrically. If the test kit and shipping container are undamaged, performing the operation verification in Chapter 4 should suffice for incoming inspection. If the test kit does not pass the verification, refer to the troubleshooting procedures in Chapter 5.

If the shipping container is damaged and the test kit fails the verification procedure, or is damaged, defective, or incomplete, keep the shipping materials and notify both the carrier and the nearest Agilent Technologies office. The Agilent Technologies office will arrange for repair or replacement of the test kit without waiting for settlement of the claim.

Table 2-1. Contents of the 87512A/B

Component	Agilent Model/Part Number	
	87512A	87512B
Resistive Signal Divider	87512-61001	87512-61002
Carrying case	87512-60011	87512-60012
Semi-rigid cable	41952-61601	41952-61601
Precision SHORT termination	11512A	85036-60012
Precision LOAD termination	909C (Opt. 012)	909E
Minimum loss pad ¹	Not included	11852B
DUT return cable	8120-4666	8120-4666

¹ only for the 87512B

ENVIRONMENTAL CONSIDERATIONS

Operating and Storage

The 87512A/B should be operated in a temperature range between 0°C and +55°C with relative humidity between 5% and 95% at 40°C (non-condensing). It may be operated at altitudes up to 4,500 meters (15,000) feet.

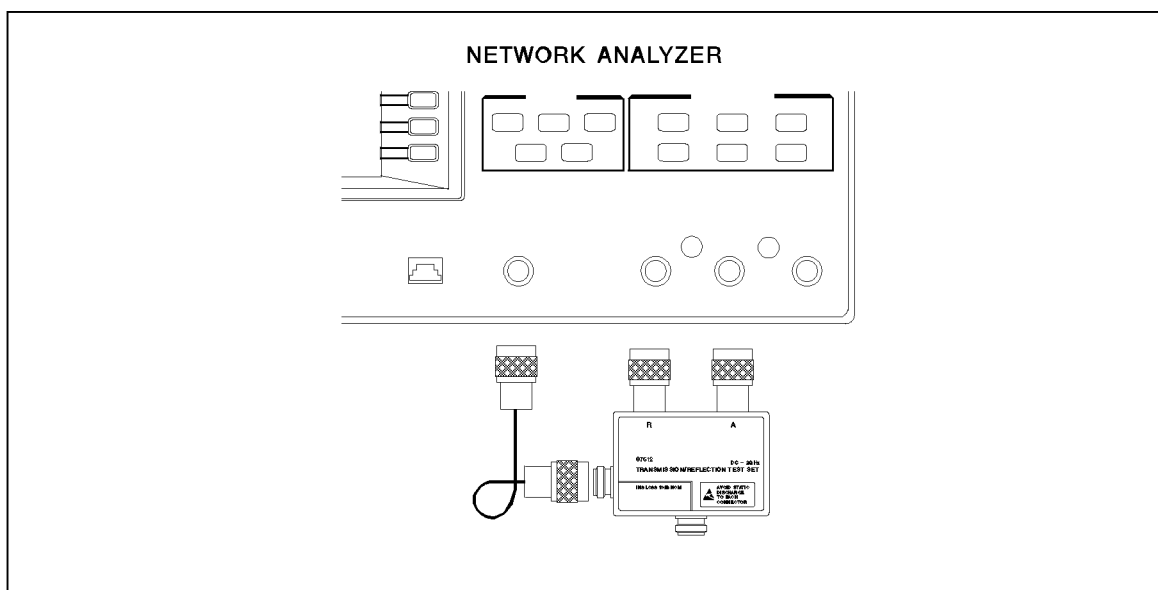
The 87512A/B may be stored in temperatures from -40°C to +70°C, with relative humidity up to 90% at +65°C (non-condensing) and at altitudes up to 15,240 meters (50,000 feet).

PREPARATION FOR USE

Connecting the Test Kit

The 87512A/B is designed to mount directly to the network analyzer as shown in Figure 2-1. The analyzer's R and A ports should be connected to the 87512A/B's R (or INCIDENT) and A (or REFLECTED) ports, respectively. The analyzer's RF OUT port should be connected to the test kit RF IN port using semi-rigid cable.

The device under test should be connected to the test set's TEST PORT. The flexible coaxial cable connects the test device output to the analyzer port B to allow transmission measurements. A 75Ω to 50Ω minimum loss pad included in the 87512B matches the flexible cable and the analyzer's 50Ω port B to 75Ω test devices.



A8102/001

Figure 2-1. Test Kit Connections

Note

Ensure that the test kit is firmly connected to the analyzer R and A port connectors. If any of the connections are loose, the analyzer may display erratic measurements.

Mating Connectors

The TEST PORT of the 87512A is a precision 50 Ω type-N female connector and mates with precision 50 Ω type-N male connectors. The TEST PORT of the 87512B is a precision 75 Ω type-N female connector and mates with precision 75 Ω type-N male connectors.

Caution

Do not mate type-N 50 Ω connectors to type-N 75 Ω connectors or damage may result.

The RF IN, R, and A ports of the 87512A/B are precision 50 Ω type-N connectors which mate with the corresponding precision type-N connectors whose dimensions conform to US specification MIL-C-39012.

Power and Control Connections

Power is not required for the 87512A/B.

PACKAGING

If shipping to a Agilent Technologies service center is required, each test kit should be repackaged using the original factory packaging materials.

Alternatively, comparable packaging materials may be used. Wrap the test kit in heavy paper or anti-static plastic. Use sufficient shock absorbing material on all sides of the 87512A/B to provide a thick, firm cushion and prevent movement. Seal the shipping container securely and mark it *FRAGILE*.

In any correspondence with Agilent Technologies, refer to the 87512A/B by its full model and serial number.

Operation

INTRODUCTION

This chapter illustrates the features of the 87512A/B (Figure 3-1. Figure 3-2 shows a typical test kit measurement setup.

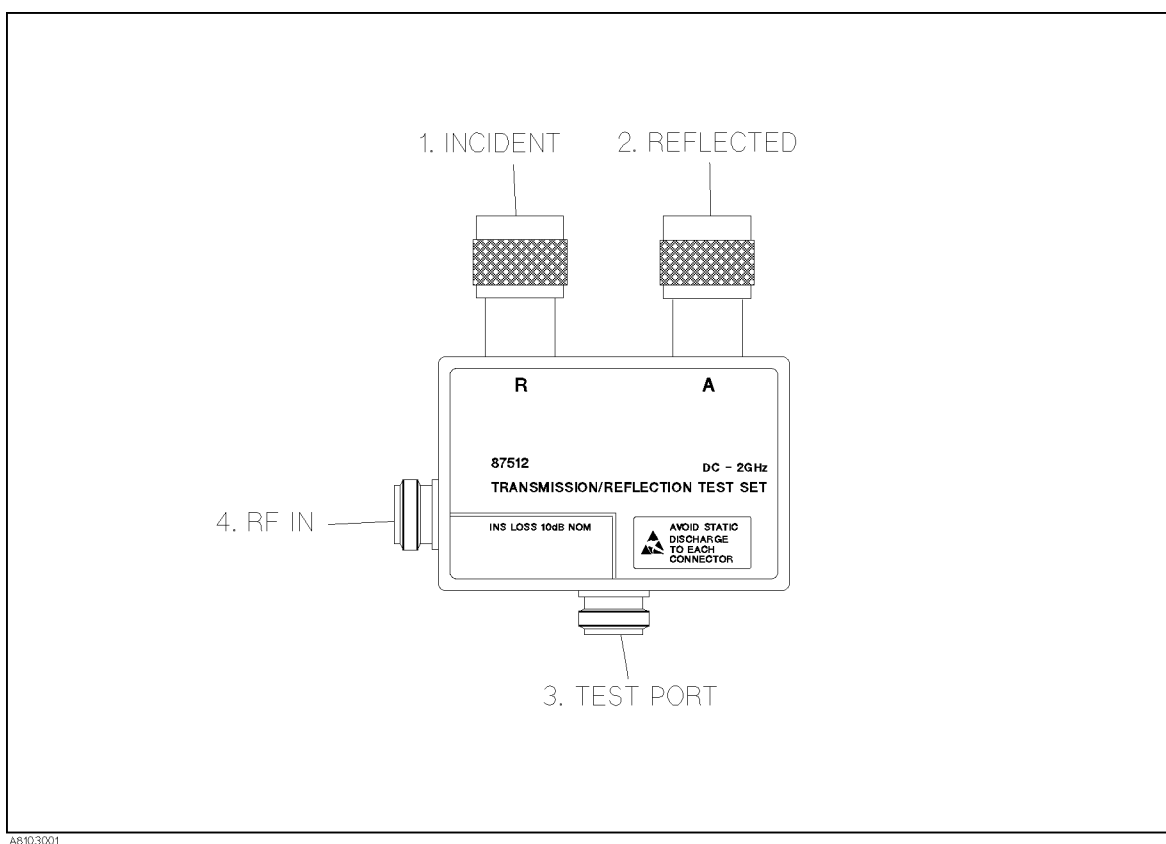


Figure 3-1. Test Kit Features

1. **INCIDENT.** This connector routes a portion of the incident signal from the analyzer source to input R of the network analyzer. This signal is used as the reference signal in ratio measurements.
2. **REFLECTED.** This connector returns the reflected signal from the device under test to input A of the analyzer.
3. **TEST PORT.** The device under test is connected here. This connector provides the output signal to the DUT and receives the reflected signal from the DUT. The 87512A TEST PORT connector is a 50Ω type-N connector. The 87512B TEST PORT connector is 75Ω type-N connector.

Caution

Do not apply a signal higher than +23 dBm to the TEST PORT.



-
4. *RF IN*. This connector receives the RF signal from the analyzer RF OUT and splits it between the TEST and INCIDENT ports.
-

TYPICAL MEASUREMENT SETUP

Figure 3-2 shows the typical measurement setup using the 87512A/B.

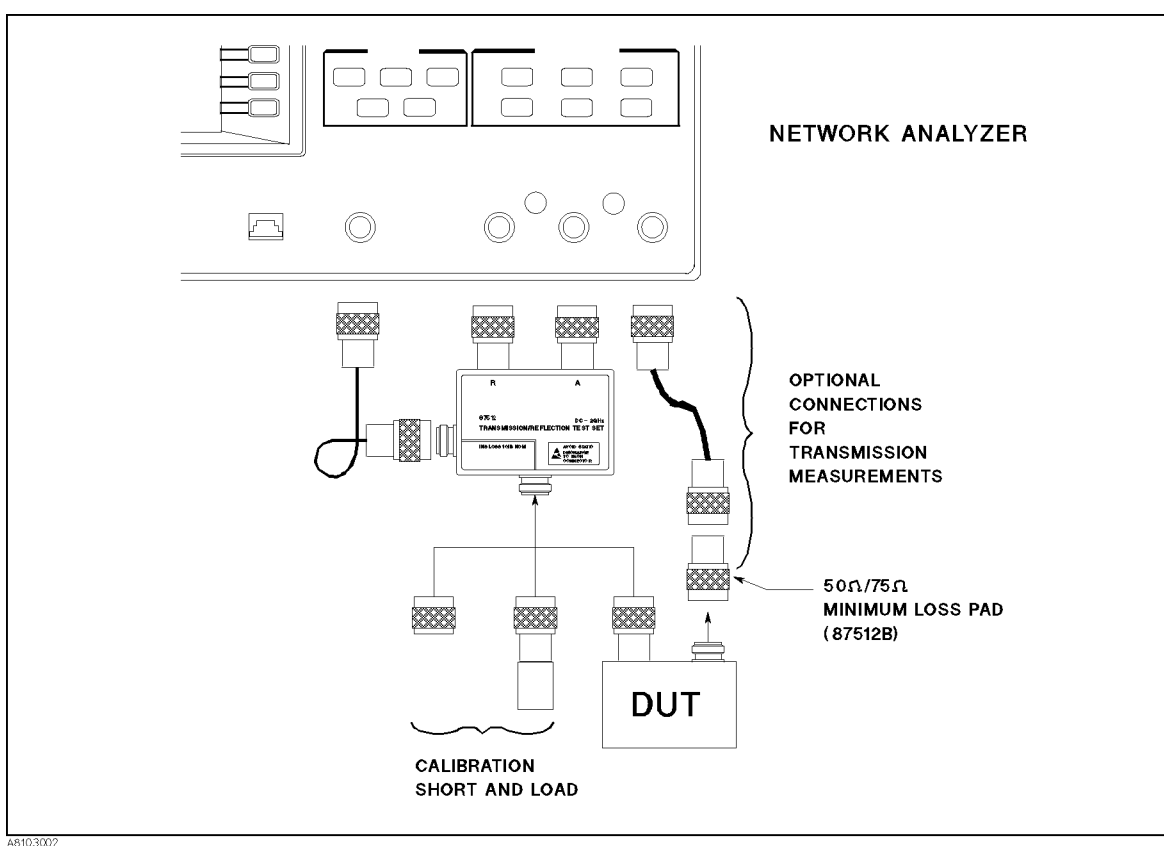


Figure 3-2. Typical Measurement Setup

One Port Measurements

One Port Calibration

The 87512A/B should be calibrated for reflection measurements using the internal calibration function of the analyzer. The calibration function requires the standards used to be attached in place of a test device during calibration. Refer to the analyzer's manual for a complete description of the calibration procedure.

3-2 Operation

Reflection Coefficient/Return Loss

After performing a one port calibration, connect the test device to the TEST PORT. Then, select the A/R or S_{11} measurement function . The reflection coefficient is displayed by selecting the LIN MAG display function. The return loss is displayed by selecting the LOG MAG display function.

Complex Impedance

Complex impedance measurements are made by the analyzer's CONVERSION function to convert the reflection coefficient to the impedance parameter. Refer to the analyzer's manual.

Two Port Measurements

Two Port Calibration

The 87512A/B should be calibrated for transmission measurements using the internal calibration function of the analyzer. The calibration function requires the standards used to be attached in place of a test device during calibration. Refer to the analyzer's manual for a complete description of the calibration procedure.

Transmission Measurements

By using the 87512A/B transmission calibration and the ratio measurement functions, the gain or loss of the device under test can be displayed directly in decibels or linear ratio units. The calibration function removes the effects of the 87512A/B and the connecting cables. The analyzer measurement functions B/R or S_{21} calculates the gain or loss of the test device. The test device is connected between the TEST PORT and the analyzer B port using the flexible cable included in the test set.

Operational Verification

INTRODUCTION

This chapter provides the 87512A/B test procedure to measure the insertion loss test between the RF INPUT and test port of the test set. Two test procedures are provided for testing the test set's insertion loss. One is used when the 8751A is available as test equipment, and the other is used when the 8751A is NOT available as test equipment.

This verification procedure is typically used for incoming inspection of the 87512A/B, and to verify that the test set is in good order after it has been repaired.

VERIFICATION CYCLE

The 87512A/B requires periodic performance verification. The frequency of performance verification depends on the operating and environmental conditions under which the 87512A/B is used. Verify the 87512A/B's performance at least once a year, using the operational verification described in this chapter.

EQUIPMENT REQUIRED

Table 4-1 lists the equipment required to perform the operational verification check. Equipment that meets or exceeds the critical specifications listed in the table may be used as a substitute for the recommended models.

Table 4-1. Recommended Test Equipment

Equipment	Critical Specifications	Recommended Model
Network Analyzer ¹	No substitute	8751A
Cable ¹	N(m)-N(m) Cable	PN 8120-4666 ²
	Semi-rigid	PN 41952-61601 ²
Pad	Minimum Loss Pad, 50 Ω - 75 Ω	11852B ³
Signal Generator ⁴	Frequency: 500 MHz	8663A
	Output Level: 0 dBm	
Power Meter ⁴	Frequency: 500 MHz	436A
	Amplitude: -15.7 to 0 dBm	
Power Sensor ⁴	Frequency: 500 MHz	8482A
	Amplitude: -15.7 to 0 dBm	
50 Ω Termination ⁴	Type: N-female	909C Opt. 013, 2 ea.

1 This equipment is used for the insertion loss test with an 8751A.

2 This equipment is furnished with the 87512A/B.

3 11852B is furnished with 87512B.

4 This equipment is used for the insertion loss test without an 8751A.

INSERTION LOSS TEST WITH AN 8751A

This test checks the 87512A/B insertion loss between the RF INPUT and the TEST PORT using an 8751A.

Test Equipment

Network Analyzer	8751A
N(m)-N(m) Cable, 50 Ω	PN 8120-4666 (Furnished with the 87512A/B)
Semi-rigid Cable	PN 41952-61601 (Furnished with the 87512A/B)
Minimum Loss Pad, 50 Ω - 75 Ω (87512B only)	11852B (Furnished with the 87512B)

Procedure

1. Connect an N(m)-N(m) Cable between the 8751A RF OUT connector and the 8751A input-B connector.

2. Setup the 8751A as follows:

Control Settings

Key Strokes

PRESET

PRESET

Meas. Config.: B

MEAS, **B**

Sweep Type: LOG FREQ

MENU, **SWEEP TYPE MENU**, **LOG FREQ**

IF BW = 2 Hz

AVG, **IF BW**, **2**, **x1**

3. Perform the following key strokes to perform the THRU calibration.

CAL, **CALIBRATE MENU**, **RESPONSE**, **THRU**, **DONE: RESPONSE**

4. Connect the 87512A/B as shown in Figure 4-1.

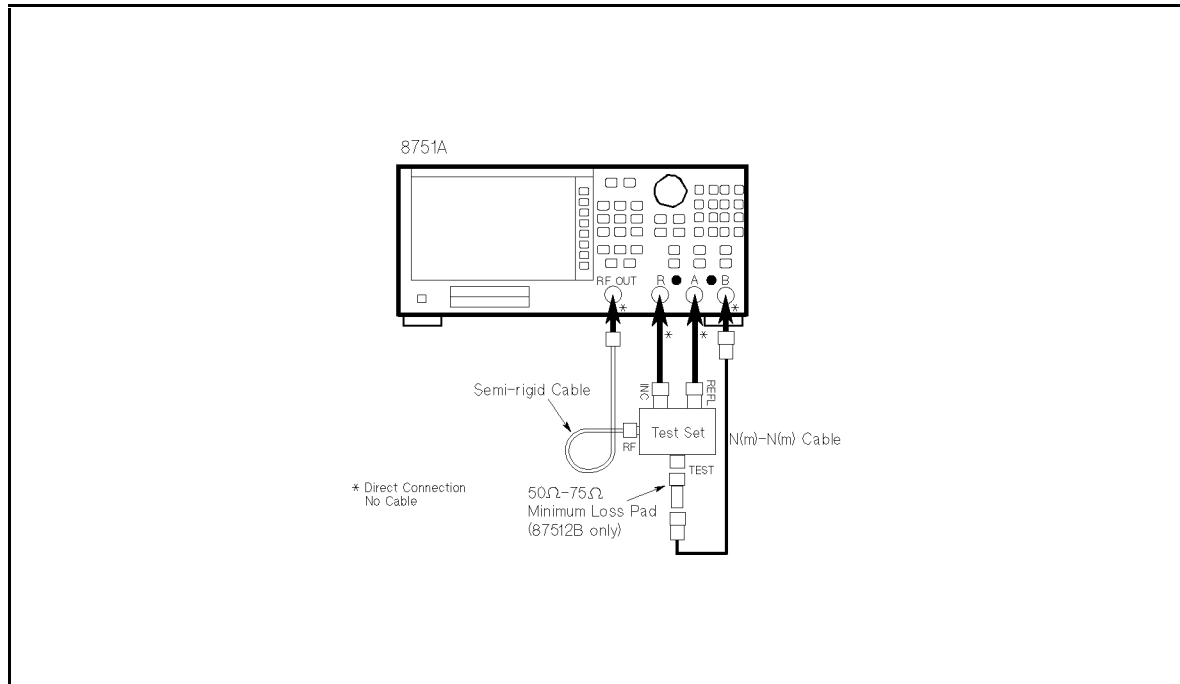


Figure 4-1. Insertion Loss Test Setup With an 8751A

- Press **MKR FCTN**, **MKR SEARCH**, **MAX** to move the marker to MAX. Confirm that the reading value is within the following limits:

87512A: $-10 \text{ dB} \pm 1 \text{ dB}$
 87512B: $-15.7 \text{ dB} \pm 1 \text{ dB}$

Note



The $50 \Omega - 75 \Omega$ minimum loss pad increases the 87512B test set insertion loss from -10 dB to -15.7 dB .

- Press **MIN** to move the marker to MIN. Confirm that the measurement value is within the following limits:

87512A: $-10 \text{ dB} \pm 1 \text{ dB}$
 87512B: $-15.7 \text{ dB} \pm 1 \text{ dB}$

INSERTION LOSS TEST WITHOUT AN 8751A

This test checks the 87512A/B insertion loss between the RF INPUT and the TEST PORT using Signal Generator and Power Meter.

Test Equipment

Signal Generator	8663A
Power Meter	436A
Power Sensor	8482A
50 Ω Termination	909C Opt. 013, 2 ea.
N(m)-N(m) Cable	PN 8120-4666 (Furnished with the 87512A/B)
Minimum Loss Pad, 50 Ω - 75 Ω (87512B only)	11852B (Furnished with the 87512B)

Procedure

1. Set the signal generator output for a frequency of 500 MHz and an output level of 0 dBm.
2. Calibrate the power meter and sensor with the power reference on the power sensor.
3. Connect the power sensor to the signal generator output.
4. Record the power meter reading as A.
5. Connect the test equipment as shown in Figure 4-2.

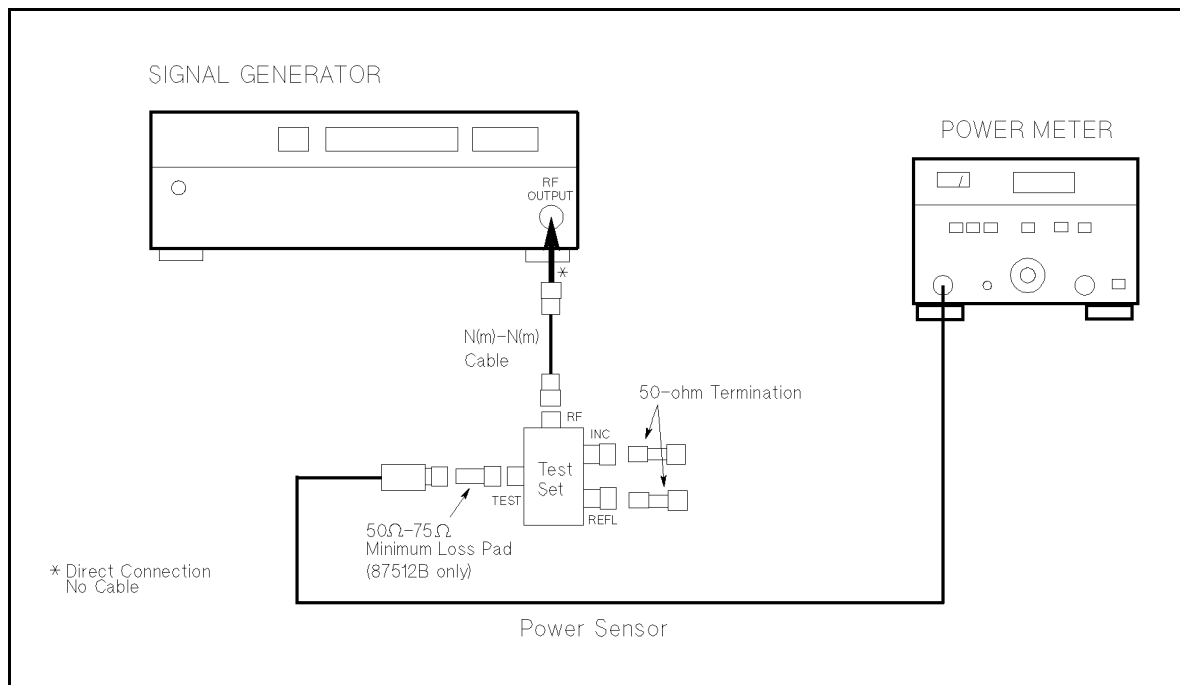


Figure 4-2. Insertion Loss Test Without an 8751A Setup

6. Record the power meter reading as B.
7. Subtract A from B.

8. Confirm that the calculated result is within the following limits:

87512A: $-10 \text{ dB} \pm 1 \text{ dB}$
87512B: $-15.7 \text{ dB} \pm 1 \text{ dB}$

Note



The 50Ω - 75Ω minimum loss pad increases the 87512B test set insertion loss from -10 dB to -15.7 dB .

Service

This chapter provides the information for servicing the signal divider of the 87512A/B Transmission/Reflection Test Kit.

Figure 5-1 shows the exploded view of the 87512A signal divider (50 Ω : PN 87511-61001) and the 87512B signal divider (75 Ω : PN 87511-61002). Table 5-1 lists the replaceable parts for the 87512A signal divider, and Table 5-2 lists the replaceable parts for the 87512B signal divider.

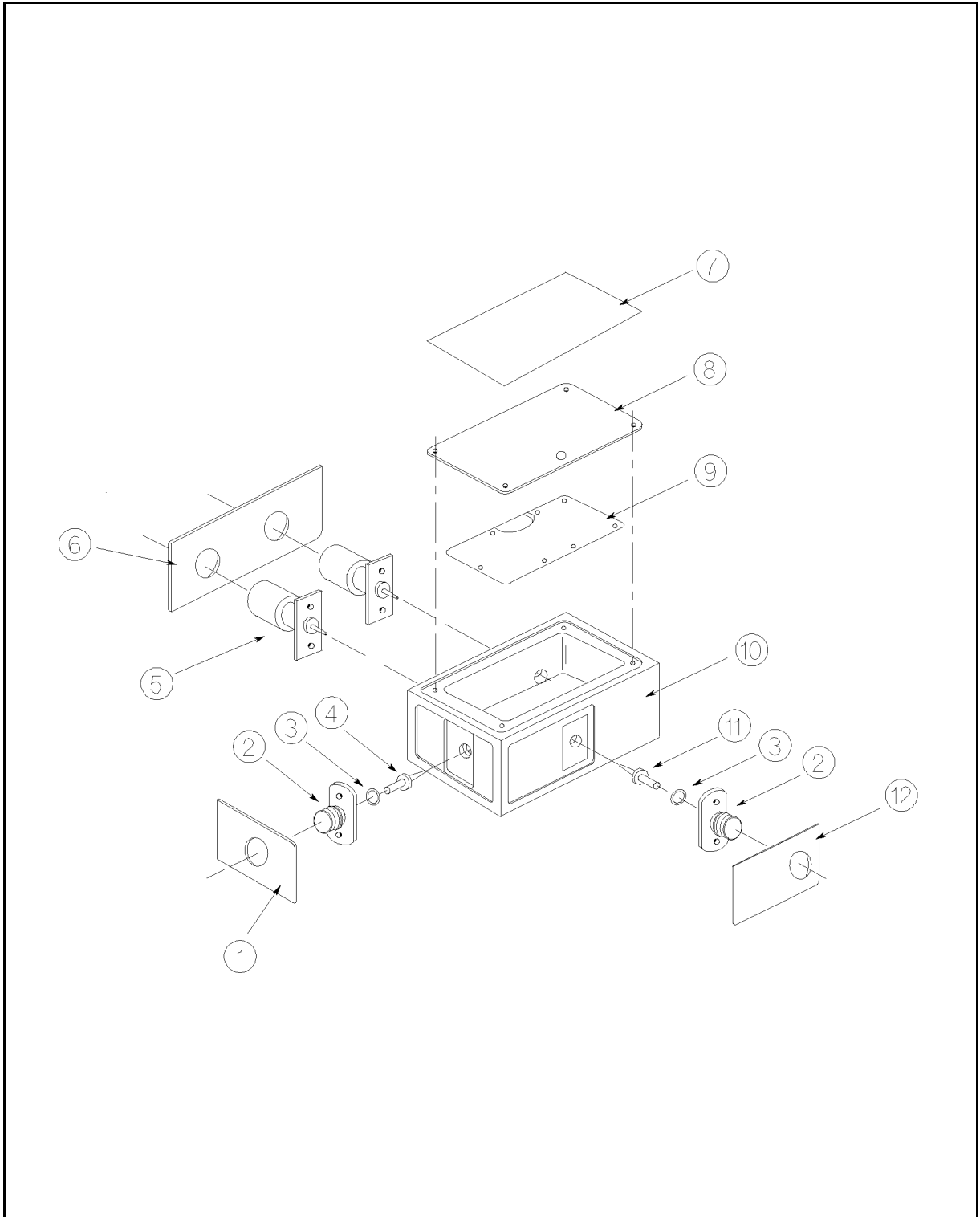


Figure 5-1. 87512A/B Signal Divider Exploded View

Table 5-1. 87512A Signal Divider Replaceable Parts Lists

Reference Designator	Part No.	C D	Qty	Description	Mfr	Mfr Part No.
1	87512-87114	6	1	Label "RF IN"	28480	87512-87114
2	1250-0549	4	2	Body-RF Connector Type N Female	28480	1250-0549
	0515-0999	9	4	Screw - Mach	28480	0515-0999
3	08742-0006	5	2	Spacer Outer Cond	28480	08742-0006
4	41952-60012	3	1	Inner Conductor Assy - 50 Ω	28480	41952-60012
5	1250-2229	1	2	Body-RF Connector Type N Male	28480	1250-2229
	0515-0914	8	4	Screw - Mach	28480	0515-1119
6	87512-87113	5	1	Label "REFLECTED, INCIDENT"	28480	87512-87113
7	87512-87121	3	1	Label, Top	28480	87512-87121
8	87512-04001	6	1	Housing Cover	28480	87512-04001
	0515-1873	0	4	Screw - Metric	28480	0515-1873
9	87512-66501	1	1	PC Board Assy	28480	87512-66501
	0515-0976	2	7	Screw - Mach M2 \times 0.4	28480	0515-0976
	2190-0654	5	7	Washer - LK HLCL 2	28480	2190-0654
10	87512-20001	0	1	Housing Driver	28480	87512-20001
11	41952-60012	3	1	Inner Conductor Assy - 50 Ω	28480	41952-60012
12	87512-87115	3	1	Label "TEST PORT"	28480	87512-87115

Table 5-2. 87512B Signal Divider Replaceable Parts Lists

Reference Designator	Part No.	C D	Qty	Description	Mfr	Mfr Part No.
1	87512-87114	6	1	Label "RF IN"	28480	87512-87114
2	1250-0549	4	2	Body-RF Connector Type N Female	28480	1250-0549
	0515-0999	9	4	Screw - Mach	28480	0515-0999
3	08742-0006	5	2	Spacer Outer Cond	28480	08742-0006
4	41952-60012	3	1	Inner Conductor Assy - 50 Ω	28480	41952-60012
5	1250-2229	1	2	Body-RF Connector Type N Male	28480	1250-2229
	0515-0914	8	4	Screw - Mach	28480	0515-1119
6	87512-87113	5	1	Label "REFLECTED, INCIDENT"	28480	87512-87113
7	87512-87122	4	1	Label, Top	28480	87512-87122
8	87512-04001	6	1	Housing Cover	28480	87512-04001
	0515-1873	0	4	Screw - Metric	28480	0515-1873
9	87512-66502	2	1	PC Board Assy	28480	87512-66502
	0515-0976	2	7	Screw - Mach M2 \times 0.4	28480	0515-0976
	2190-0654	5	7	Washer - LK HLCL 2	28480	2190-0654
10	87512-20001	0	1	Housing Driver	28480	87512-20001
11	41952-60013	4	1	Inner Conductor Assy - 75 Ω	28480	41952-60013
12	87512-87116	8	1	Label "TEST PORT"	28480	87512-87116

Manual Changes

Introduction

This appendix contains the information required to adapt this manual to earlier versions or configurations of the 87512A/B than the current printing date of this manual. The information in this manual applies directly to the 87512A/B Transmission/Reflection Test Set serial number prefix listed on the title page of this manual.

MANUAL CHANGES

To adapt this manual to your 87512A/B, refer to Table A-1 and make all of the manual changes listed opposite your test set's serial number.

Test sets manufactured after the printing of this manual may be different than those documented in this manual. Later test set versions will be documented in a manual changes supplement that will accompany the manual shipped with that test set. If your test set's serial number is not listed on the title page of this manual or in Table A-1, it may be documented in a *yellow MANUAL CHANGES* supplement.

Table A-1. Manual Changes by Serial Number

Serial Prefix or Number	Make Manual Changes
3027J and 3045J	Change 1

Change 1

Page 1-3, Table

Change as follows.

(1)	Carrying Case	87512-60001	87512-60002	1
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Page 1-6, Tabel 1-2 Specifications

Change as follows.

Frequency Range	5 Hz to 500 MHz	5 Hz to 500 MHz
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Page 1-6, Tabel 1-3 Operating Characteristics

Change as follows.

Equivalent Source Match ^{1, 2}	30 dB	25 dB
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Page 2-1, Tabel 2-1 Contents of the 87512A/B

Change as follows.

Carrying case	87512-60001	87512-60002
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Page 5-3, Tabel 5-1. 87512A Signal Divider Replaceable Parts Lists

Change as follows.

7	87512-87111	3	1	Label, Top	28480	87512-87111
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Page 5-3, Tabel 5-2. 87512B Signal Divider Replaceable Parts Lists

Change as follows.

7	87512-87112	4	1	Label, Top	28480	87512-87112
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