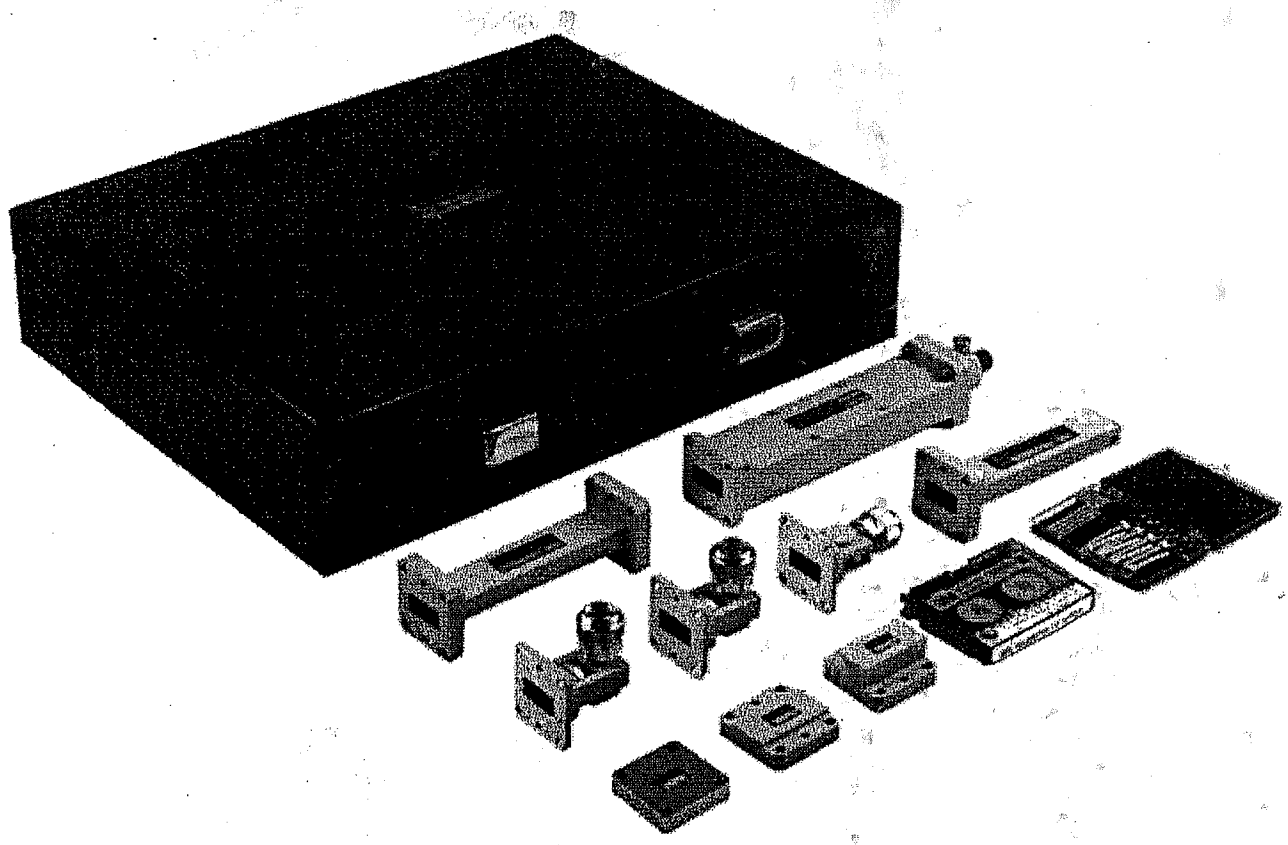
Operating Instructions

Waveguide Calibration Kit

WR90 8.2 to 12.4 GHz

Model X7005E( )



X7005-71D

MAURY MICROWAVE
CORPORATION

Contents

General Information

Description, Specifications, and Equipment Provided

This manual applies to the calibration kit models listed in **Table 1** for calibrating network analyzers in WR90 waveguide from 8.2 to 12.4 GHz. This waveguide calibration kit can be used for a standard Short-Short-Load-Thru (SSLT) calibration for either 1-port or 2-port measurements. Refer to Maury data sheet 3H-013 following these operating instructions for general information and specifications. All components in this kit are provided with Maury precision WR90 flanges with precision indexing holes. These flanges are designed for improved repeatability and measurement accuracy.

The calibration constants disk or tape provided with the calibration kit and the applicable network analyzer is shown in **Table 1** below:

Cal Kit Model	Network Analyzer (VNA)	Calibration Constants Disk or Tape
X7005E(*)3	Agilent 8510A/B	X7005S13
X7005E(*)4	Agilent 8510C	X7005S14
X7005E(*)5	Agilent 8719/20/22	X7005S15
X7005E(*)7	Agilent PNA Series	X7005S17
X7005E(*)8	Anritsu 360	X7005S18
X7005E(*)9	Anritsu 37000	X7005S19

NOTE: (*) refers to adapter set option supplied with cal kit (see Maury data sheet 3H-013).

Table 1

CAUTION: Supporting Test Port Adapters

When making measurements, make sure that your test setup does not apply damaging stress to the connectors on the test set. This is particularly critical when the items are heavy or long. Always properly support the test port adapters being used.

CAUTION: Avoid Electrostatic Discharge

When cleaning the connectors on the test set, be aware that you are touching exposed center conductors that are connected directly to the sensitive internal circuits of the network analyzer. Therefore, make sure that you and your equipment are grounded before touching any center conductor. A grounded wrist strap is recommended.

Flange Information

Maury Precision Indexing Hole Technique

All components in this kit are supplied with precision WR90 flanges that have indexing holes (see Maury data sheet 5E-006A). For optimum accuracy and repeatability, the indexing pins provided should be used to ensure proper flange mating alignment - see **Figure 1.**

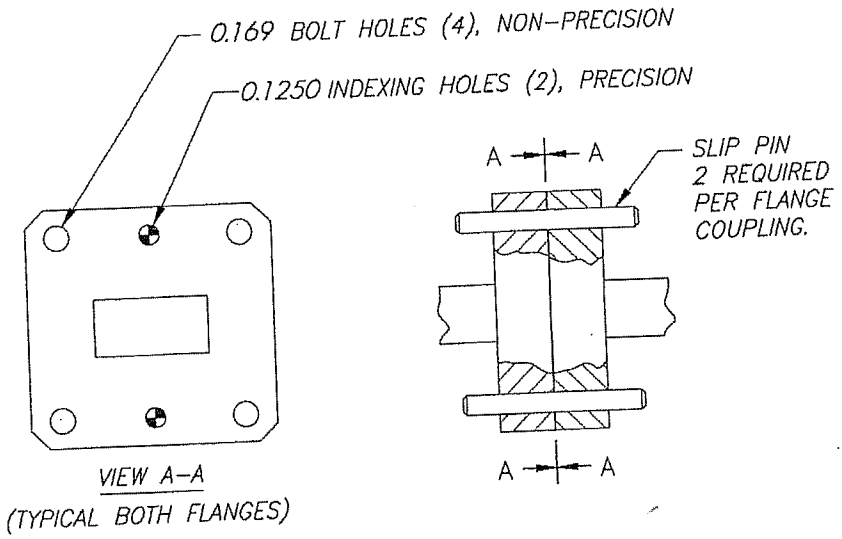


Figure 1. Flange Mating with Indexing Pins

Mounting Hardware

This calibration kit is provided with the following hardware:

- 8 each 8-32 x 1.0 inch long bolts.
- 8 each 8-32 nuts.

Indexing Pins Provided

- 4 each - P/N W996D1 (0.1239 diameter x 1.37 long).
- 4 each - P/N W996D2 (0.1239 diameter x 0.62 long).

Indexing pins are supplied in two lengths:

- The long length is generally easier to use.
- The short length is used in tight access cases or when it is intended to leave the pins in the flange coupling.

Test Port Flanges

The coax to waveguide adapters provided should be used as test ports. They are supplied with the indexing holes required for precision measurements. Refer to **Figures 2** through **5** for examples of setting up test ports.

The end launch adapter may be connected directly to the network analyzer test port. If the adapter or Device Under Test (DUT) is too large to fit close to the test port, you can do one of the following:

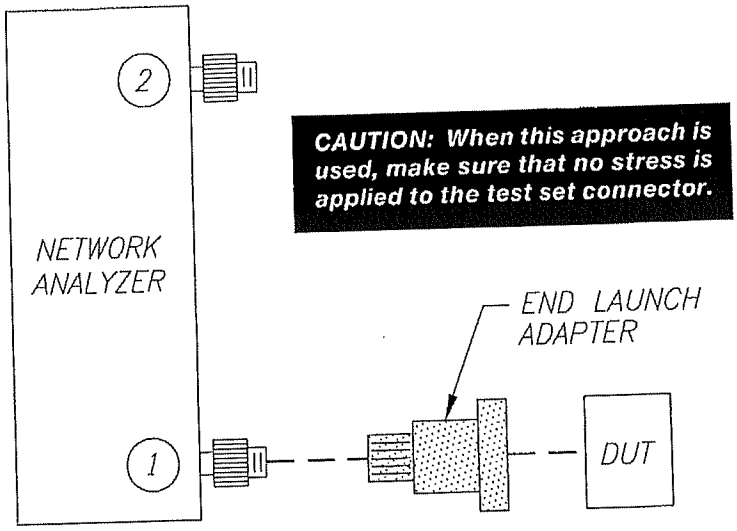
- Use a flexible cable to connect the waveguide adapter (see **Figure 3**).
- Use a spacer under the test set to increase connector height for clearance of the adapter and devices under test.

When an extension cable is used, it is recommended that the waveguide adapter be clamped to the test bench to provide the best stability.

CAUTION: When clamping an adapter, make sure that damaging force is not applied.

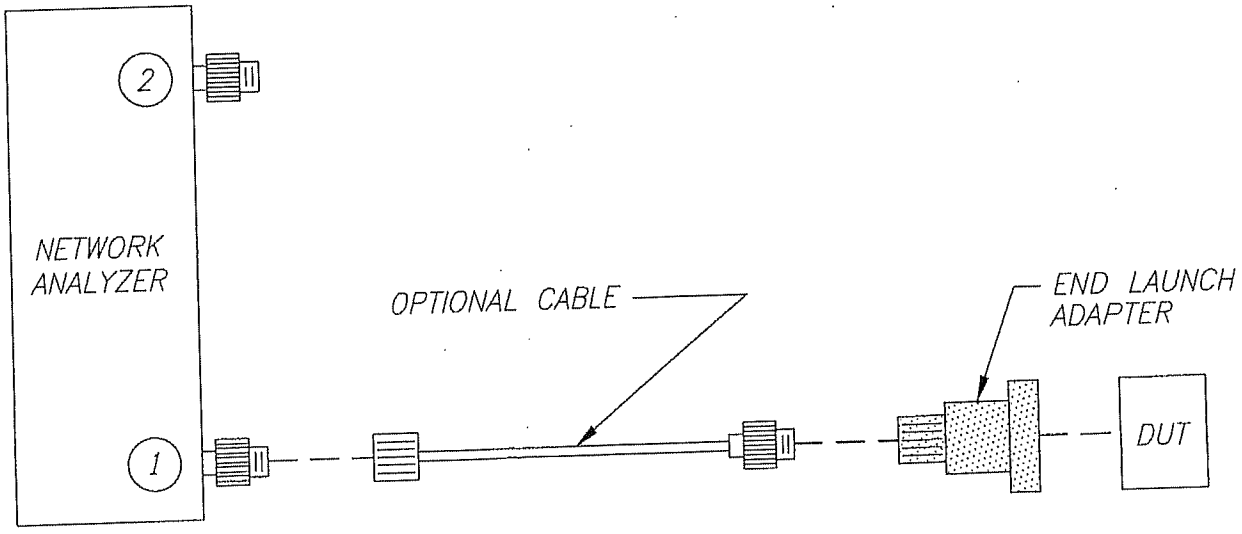
Flange Maintenance

Flanges should be inspected prior to use. For optimum results, they should be free of any imperfections, scratches, nicks, dirt, etc. Re-lap flange faces to 16 micro-inch surface finish (or better) and corresponding flatness using a figure eight motion. ***Use caution*** when lapping offset short flange faces since the offset length is critical for optimum calibration. When not in use, flanges should be covered with a protective flange cover.



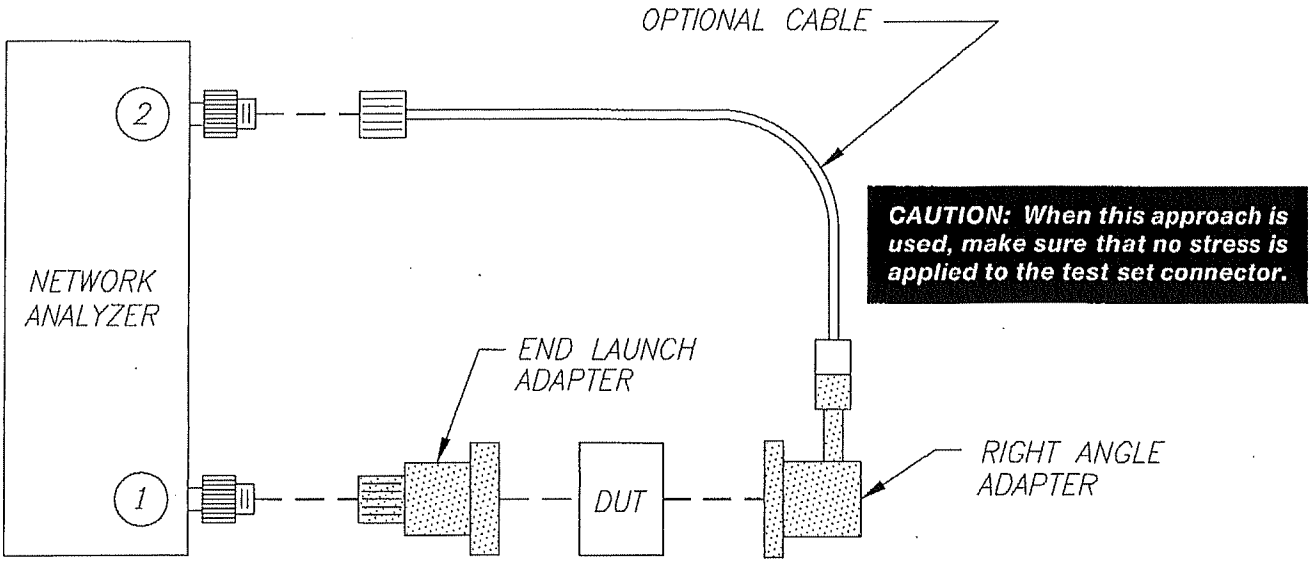
NOTE: *Due to the adapter and DUT size, the test set may need to be elevated to provide adequate clearance or the setup in* ***Figure 3*** *may be used.*

Figure 2. Test Port Setup for 1-Port Measurement



NOTE: *Adapter should be clamped to bench for best stability.*

Figure 3. Alternate Test Port Setup for 1-Port Measurement



NOTE: *Due to the adapter and DUT size, the test set may need to be elevated to provide adequate clearance or the setup in* ***Figure 5*** *may be used.*

Figure 4. Test Port Setup for 2-Port Measurement Using a Single Return Cable

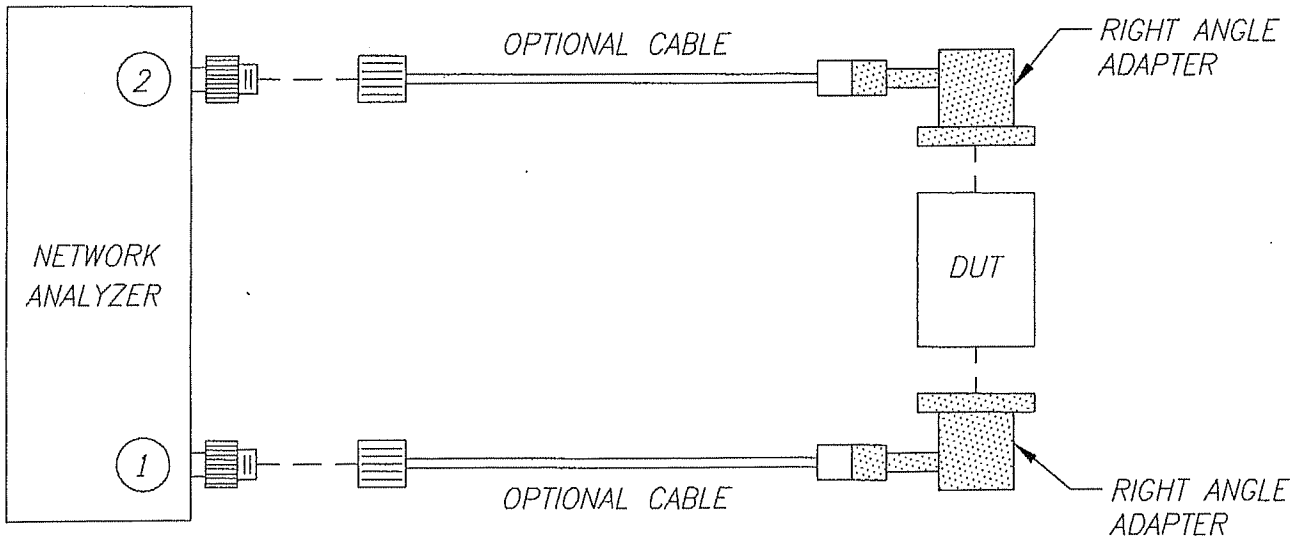


Figure 5. Alternate Test Port Setup for 2-Port Measurement

Instrument Case

Some instrument cases are supplied with removable stacking lids. Refer to the information below for instructions on how to use the stacking lid case.

Lid Stacking Procedure

a) Open case.
b) Slide lid off base and place top down on flat surface.
c) Place base on lid (the feet on bottom of base fit into lid, see **Figure 6**).
d) To replace lid - simply reverse procedure.

The foam insert in instrument cases will vary depending on the calibration kit. Also, the handle shown is not provided on all instrument cases.

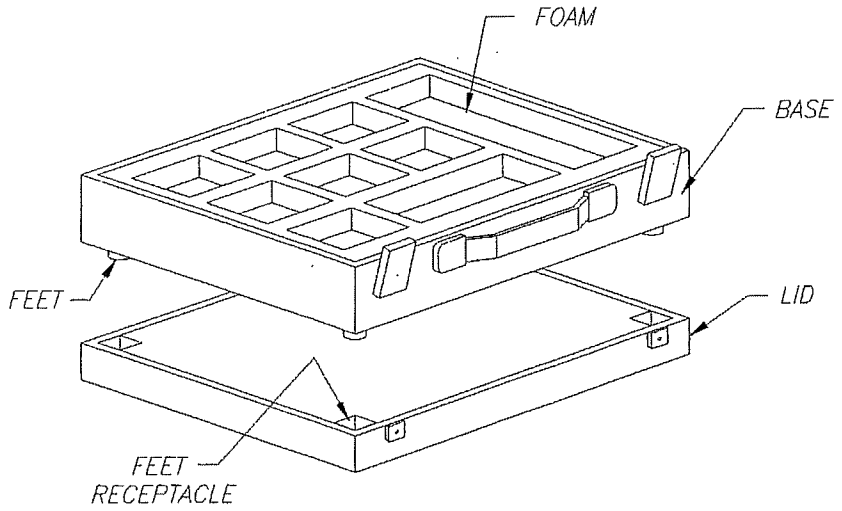


Figure 6: Operation of Stacking Lid Instrument Case

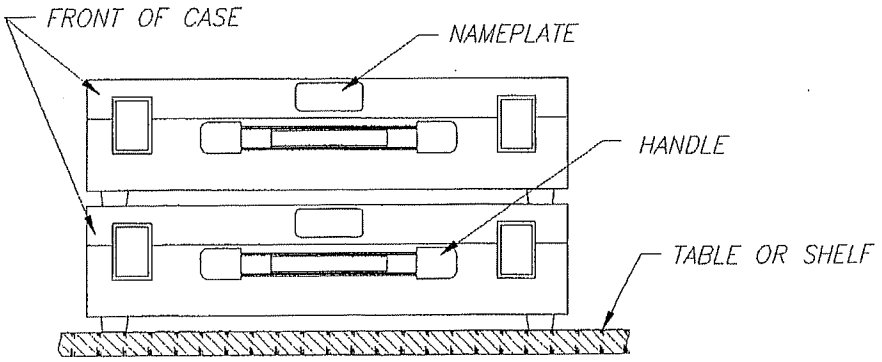


Figure 7: Storage of Stacking Lid Instrument Cases

Operating Instructions

This section contains instructions for loading the calibration constants disk or tape into the network analyzers listed in **Table 2**. For calibration instructions, please refer to the network analyzer operating manual.

NOTE: *If a calibration constants disk or tape is not available, the constants can be loaded by hand from the network analyzer front panel using instructions in the network analyzer manual and the calibration kit data tables referenced in* ***Table 2****.*

See the appropriate paragraph section for loading the calibration kit data into your network analyzer, noting that "press" refers to hard keys and "select" refers to soft keys.

Network Analyzer	Calibration Constants Disk or Tape	Calibration Kit Label	Tape File No./ Disk File Name	Cal Kit Data Tables
Agilent 8510A/B	X7005S13	X7005S1 B	2	3, 4
Agilent 8510C	X7005S14		CK_X7005SB	
Agilent 8719/20/22	X7005S15	X7005SC	X7005SC	5, 6
Agilent PNA Series	X7005S17	X7005S	X7005S.ckt	7, 8, 9
Anritsu 360	X7005S18	—	—	10
Anritsu 37000	X7005S19			

Table 2

1. *Loading the Model X7005S13 Calibration Constants Tape into the Agilent 8510A/B*

a) Make sure the calibration constants tape is protected against accidental recording by verifying the RECORD tab is opposite the arrow, and then insert into the Agilent 8510A/B tape drive.
b) Press TAPE key.
c) Select "LOAD".
d) Select "CAL KIT".
e) Select CAL KIT "#1" or "#2".
f) Select "FILE #2". The tape drive light will come on as the data is read from the tape. When the tape drive stops, remove the calibration constants tape.
g) Select CAL menu, and look at the label of the cal kit to make sure that it is correctly loaded. Refer to **Table 2** for proper cal kit label.
h) Select "MORE".
i) Select "SET ZØ", enter 1.0, and press x1.

NOTE: ***If step "i" is omitted, the analyzer may appear to work but will give degraded results.*** *Also, when finished with waveguide measurements, the system Z_0 should be changed back for coaxial measurements.*

j) Press CAL key. The network analyzer is now ready for calibration using the calibration kit corresponding to the cal kit label displayed. (See **Table 2**.)

2. Loading the Model X7005S14 Calibration Constants Disk into the Agilent 8510C

a) Make sure the calibration constants disk is protected against accidental recording by verifying the WRITE PROTECT tab window is open, and then insert into the disk drive.
b) Press DISC key.
c) Select "LOAD".
d) Select "CAL KIT 1-2".
e) Select CAL KIT "#1" or "#2".
f) Select "CK_X7005SB". Select "LOAD FILE". The disk drive light will come on as the data is read from the disk. When the disk drive stops, remove the calibration constants disk.
g) Press CAL key, and look at the label of the cal kit to make sure that it is correctly loaded. Refer to **Table 2** for proper cal kit label.
h) Select "MORE".
i) Select "SET ZØ", enter 1.0, and press x1.

NOTE: If step "i" is omitted, the analyzer may appear to work but will give degraded results. *Also, when finished with waveguide measurements, the system Z_0 should be changed back for coaxial measurements.*

j) Press CAL key. The network analyzer is now ready for calibration using the calibration kit corresponding to the cal kit label displayed. (See **Table 2.**)

3. Loading the Model X7005S15 Calibration Constants Disk into the Agilent 8719/20/22 (Models with Internal Disk Drive)

a) Make sure the calibration constants disk is protected against accidental recording by verifying the WRITE PROTECT tab window is open, and then insert into the disk drive.
b) Press LOCAL key.
c) Select "SYSTEM CONTROLLER".
d) Press SAVE/RECALL key.
e) Select "SELECT DISK".
f) Select "INTERNAL DISK".
g) Select " RETURN" .
h) Select "RECALL STATE". The disk drive light will come on as the data is read from the disk. When the disk drive stops, remove the calibration constants disk.
i) Enter the desired start and stop frequency. Some analyzers require a start or stop frequency to be entered manually even if it's the same as the default frequency in order to keep calibration correction turned on.
j) Press CAL key, and look at the label of the cal kit to make sure that it is correctly loaded.
k) Select "MORE".
l) Select "SET ZØ", enter 1.0, and press x1.

NOTE: If step "l" is omitted, the analyzer may appear to work but will give degraded results. *Also, when finished with waveguide measurements, the system Z_0 should be changed back for coaxial measurements.*

m) Press CAL key. The network analyzer is now ready for calibration using the calibration kit corresponding to the cal kit label displayed. (See **Table 2.**)

4. *Loading the Model X7005S15 Calibration Constants Disk into the Agilent 8719/20/22 (Models Without Internal Disk Drive)*

a) Make sure the calibration constants disk is protected against accidental recording by verifying the WRITE PROTECT tab window is open, and then insert into the external disk drive.
b) Press LOCAL key.
c) Select "SYSTEM CONTROLLER".
d) Press RECALL key.
e) Select "LOAD FROM DISK".
f) Select "READ FILE TITLES".
g) Select "LOAD X7005SC". The disk drive light will come on as the data is read from the disk. When the disk drive stops, remove the calibration constants disk.
h) Enter the desired start and stop frequency. Some analyzers require a start or stop frequency to be entered manually even if it is the same as the default frequency in order to keep calibration correction turned on.
i) Select CAL key, and look at the label of the cal kit to make sure that it is correctly loaded. Refer to **Table 2** for proper cal kit label.
j) Select "MORE".
k) Select "SET ZØ", enter 1.0, and press x1.

NOTE: If step "k" is omitted, the analyzer may appear to work but will give degraded results. *Also, when finished with waveguide measurements, the system Z_0 should be changed back for coaxial measurements.*

l) Press CAL key. The network analyzer is now ready for calibration using the calibration kit corresponding to the cal kit label displayed. (See **Table 2.**)

5. *Loading the Model X7005S17 Calibration Constants Disk into the Agilent PNA*

NOTE: This calibration constants disk contains two files (X7005S sliding.ckt and X7005S fixed.ckt). These two files differ in the order of standard precedence in the S11c and S22c class definitions. This difference in standard order facilitates proper device selection by the PNA Smart Cal (GUIDED) calibration method. Either file will work for the UNGUIDED calibration method.

a) Make sure the calibration constants disk is protected against accidental recording by verifying the WRITE PROTECT tab window is open, and then insert into the disk drive.
b) Click "My Computer" icon on desktop.
c) Click "3-1/2 Floppy (A:)".
d) Copy files X7005S sliding.ckt and X7005S fixed.ckt.
e) Save these files in directory: "C:\Program Files\Agilent\Network Analyzer\Pna Cal Kits\user".
f) Close window and return to PNA application.

NOTE: X7005S sliding.ckt and X7005S fixed.ckt calibration files are now resident on the PNA hard drive. In order to use this kit for calibration, the following steps must be completed to import each cal kit file.

g) Click "Calibration", select "Advanced Modify Cal Kit".
h) Click " Import Kit".
i) Select "Look In" down arrow and click "PNACalKits" folder.
j) Click "User" folder, select X7005S sliding.ckt file and click "Open". Repeat steps h through j for X7005S fixed.ckt.
k) Click "Ok" in "Edit PNA Cal Kits" window.

NOTE: Steps g thru k must be repeated following any "Restore Defaults" to reactivate the X7005S sliding.ckt and X7005S fixed.ckt cal kit file.

6. *Loading the Model X7005S18 Calibration Constants Disk into the Anritsu 360 or Model X7005S19 Calibration Constants Disk into the Anritsu 37000 Series Analyzers*

a) Select UTILITY MENU.

NOTE: *If you are in the middle of a calibration, the UTILITY MENU will be inactive. In that case, first select SETUP MENU, and then select UTILITY MENU.*

b) Use the menu arrows to select CALIBRATION COMPONENTS UTILITIES, then press ENTER.
c) Install the calibration constants disk into the disk drive. Use the menu arrows to select INSTALL CALIBRATION COMPONENT INFORMATION FROM DISK, then press ENTER. When the disk drive light goes out, remove the disk.
d) Use the menu arrows to select DISPLAY INSTALLED COMPONENT INFORMATION, then press ENTER.
e) Use the menu arrows to select WAVEGUIDE, then press ENTER. Verify that the displayed waveguide parameters on the screen match the values given in **Table 10**.

NOTE: *The data from the disk will replace the waveguide constants in the analyzer.*

Maintenance, Calibration & Warranty

Maintenance

This calibration kit is relatively maintenance free if the devices are handled with the same care that is appropriate to all precision equipment. As with any precision waveguide device, proper care should be taken to assure clean mating flanges, proper flange alignment, and proper torquing of flange hardware. Servicing should be referred to our Customer Service Department.

Calibration

To verify that your calibration kit is performing to traceable specifications, periodically send the kit to Maury Microwave Corporation for calibration. The recommended calibration cycle is one year, although actual need may vary depending on usage.

Should Additional Information or Service be Required, Address Inquiries to:

Maury Microwave Corporation
Attention: Customer Service
2900 Inland Empire Boulevard
Ontario, California 91764-4804
USA

Phone: (909) 987-4715
E-mail: maury@maurymw.com
Facsimile: (909) 987-1112
Web site: http://www.maurymw.com

Please mention the model number and revision of the software and the date received in any correspondence.

Warranty

We warrant each instrument of our manufacture to be free from defects in material and workmanship. Our obligation under this warranty is limited to servicing or adjusting any instrument returned to our factory for that purpose, and to making good at our factory any part or parts thereof except fuses or batteries. This warranty period is limited to one year from date of shipment to the original purchaser, and to equipment which is returned to us with transportation charges prepaid and which, upon our examination, shall disclose to our satisfaction to have been defective. This warranty does not cover wear from normal usage nor subsequent damage after shipment.

We reserve the right to make changes in design at any time without incurring any obligation to install such changes on units previously sold by us.

This constitutes the only warranty extended by us, and is in lieu of any other obligations or liabilities on our part in connection with the sale of our equipment.

Standard Definitions

Agilent 8510 Using Maury X7005S( ) Software, WR90 (8.2 to 12.4 GHz)

System Z_0: 1.0Ω
Disk File Name: CK_X7005SB

Calibration Kit Label: X7005S1 B
Tape File Number: 2

STANDARD[1]		C0 $x10^{-15}$ F	C1 $x10^{-27}$ F/Hz	C2 $x10^{-36}$ F/Hz^2	C3 $x10^{-45}$ F/Hz^3	FIXED[2] or SLIDING or OFFSET	TERMINAL[3] IMPEDANCE Ω	OFFSET			FREQ (GHz)		COAX or W/G	STND LABEL
NO.	TYPE	L0 $x10^{-12}$ H	L1 $x10^{-24}$ H/Hz	L2 $x10^{-33}$ H/Hz^2	L3 $x10^{-42}$ H/Hz^3			DELAY ps	Z_0[4] Ω	LOSS[5] GΩ/s	MIN[6]	MAX		
1	SHORT					FIXED		0.0	1.0	0.0	6.557	999.0	W/G	X344A
2	SHORT					FIXED		16.111	1.0	0.0	6.557	999.0	W/G	X340B1
3	SHORT					FIXED		48.300	1.0	0.0	6.557	999.0	W/G	X340B3
4														
5														
6														
7														
8														
9	LOAD					FIXED		0.0	1.0	0.0	6.557	999.0	W/G	FIXED[7]
10	LOAD					SLIDING		0.0	1.0	0.0	6.557	999.0	W/G	SLIDING[8]
11	THRU					FIXED		0.0	1.0	0.0	6.557	999.0	W/G	THRU[9]
12														
13														
14														
15														
16														
17														
18														
19														
20														
21														

1 Open, short, load, delay/thru, or arbitrary impedance.
2 Load or arbitrary impedance only.
3 Arbitrary impedance only, device terminating impedance (defaults: short = 0 Ω, open = ∞ Ω, load = 50 Ω).
4 Z_0 normalized.
5 Skin loss factor, normalized at 1 GHz.
6 For waveguide, minimum frequency is same as F_{co}.
7 Model X301A.
8 Model X313 or X314.
9 Test ports connected directly.

Table 3

Standard Class Assignments: Agilent 8510
Maury Software: X7005S( ), WR90 Waveguide, 8.2 to 12.4 GHz
Cal Kit Label: X7005S1 B
Tape File Number: 2
Disk File Name: CK_X7005SB

Class	A	B	C	D	E	F	G	Standard Class Label
$S_{11}A$	2							X340B1
$S_{11}B$	3							X340B3
$S_{11}C$	9	10						LOADS
$S_{22}A$	2							X340B1
$S_{22}B$	3							X340B3
$S_{22}C$	9	10						LOADS
Forward Transmission	11							THRU
Reverse Transmission	11							THRU
Forward Match	11							THRU
Reverse Match	11							THRU
Forward Isolation[1]	9							ISOL'N STD
Reverse Isolation	9							ISOL'N STD
Frequency Response	1	11						RESPONSE
TRL Thru								THRU
TRL Reflect								SHORT
TRL Line								SHIM
Adapter								UNDEFINED
TRL Option	Cal Zo: _____ System Zo					_____ Line Zo		
	Set Ref: _____ Thru					_____ Reflect		
	Lowband Frequency: _____							

1 Forward isolation standard is also used for isolation part of response and isolation calibration.

Table 4

Standard Definitions (TRL Calibration)
Agilent 8720 Series Using Maury X7005S( ) Software, WR90 (8.2 to 12.4 GHz)

System Z_0: 1.0Ω
Disk File Name: X7005SC
Calibration Kit Label: X7005SC

STANDARD[1]		C0 $x10^{-15}$ F	C1 $x10^{-27}$ F/Hz	C2 $x10^{-36}$ F/Hz^2	C3 $x10^{-45}$ F/Hz^3	FIXED[2] or SLIDING or OFFSET	TERMINAL[3] IMPEDANCE Ω	OFFSET			FREQ (GHz)		COAX or W/G	STND LABEL
NO.	TYPE	L0 $x10^{-12}$ H	L1 $x10^{-24}$ H/Hz	L2 $x10^{-33}$ H/Hz^2	L3 $x10^{-42}$ H/Hz^3			DELAY ps	Z_0[4] Ω	LOSS[5] GΩ/s	MIN[6]	MAX		
1	SHORT					FIXED		0.0	1.0	0.0	6.557	999.0	W/G	X344A
2	SHORT					FIXED		16.111	1.0	0.0	6.557	999.0	W/G	X340B1
3	SHORT					FIXED		48.300	1.0	0.0	6.557	999.0	W/G	X340B3
4	LOAD					FIXED		0.0	1.0	0.0	6.557	999.0	W/G	FIXED[7]
5	LOAD					SLIDING		0.0	1.0	0.0	6.557	999.0	W/G	SLIDING[8]
6	THRU					FIXED		0.0	1.0	0.0	6.557	999.0	W/G	THRU[9]
7														
8														

1 Open, short, load, delay/thru, or arbitrary impedance.
2 Load or arbitrary impedance only.
3 Arbitrary impedance only, device terminating impedance (defaults: short = 0 Ω, open = ∞ Ω, load = 50 Ω).
4 Z_0 normalized.
5 Skin loss factor, normalized at 1 GHz.
6 For waveguide, minimum frequency is same as F_{co}.
7 Model X301A.
8 Model X313 or X314.
9 Test ports connected directly.

Table 5

Standard Class Assignments: Agilent 8720 Series
Maury Software: X7005S( ), WR90 Waveguide, 8.2 to 12.4 GHz
Cal Kit Label: X7005SC
Disk File Name: X7005SC

Class	A	B	C	D	E	F	G	Standard Class Label
$S_{11}A$	2							X340B1
$S_{11}B$	3							X340B3
$S_{11}C$	4	5						LOADS
$S_{22}A$	2							X340B1
$S_{22}B$	3							X340B3
$S_{22}C$	4	5						LOADS
Forward Transmission	6							THRU
Reverse Transmission	6							THRU
Forward Match	6							THRU
Reverse Match	6							THRU
Response	1	6						RESPONSE
Response & Isolation	1	4	6					RESPONSE
TRL Thru								THRU
TRL Reflect								SHORT
TRL Line								SHIM
Adapter								UNDEFINED
TRL Option	Cal Zo: _____ System Zo					_____ Line Zo		
	Set Ref: _____ Thru					_____ Reflect		
	Lowband Frequency: _____							

Table 6

Standard Definitions Agilent PNA Series Using Maury X7005S17 Software, WR90 Waveguide, (8.2 to 12.4 GHz)

DISK FILE NAMES: X7005S sliding.ckt and X7005S fixed.ckt					SYSTEM Z_0: 1.0				CALIBRATION KIT NAME: X7005S Sliding and X7005S Fixed								
STANDARD[a]			C0 $X10^{-15}$ F	C1 $X10^{-27}$ F/Hz	C2 $X10^{-36}$ F/Hz^2	C3 $X10^{-45}$ F/Hz^3	FIXED[b] OR SLIDING OR OFFSET	TERMINAL[c] IMPEDANCE Ω	OFFSET			FREQUENCY (GHz)		COAX OR W/G	STANDARD LABEL
ID NO.	TYPE	DESCRIPTION	L0 $X10^{-12}$ H	L1 $X10^{-24}$ H/Hz	L2 $X10^{-33}$ H/Hz^2	L3 $X10^{-42}$ H/Hz^3			DELAY ps	Z_0 Ω	LOSS[d] GΩ/s	MIN[e]	MAX		
1	SHORT	X344A Fixed Short	0.0	0.0	0.0	0.0			0.0	1.0	0.0	6.557	999.0	W/G	X344A
2	SHORT	X340B1 1/8 Offset Short (0.483cm)	0.0	0.0	0.0	0.0			16.111	1.0	0.0	6.557	999.0	W/G	X340B1
3	SHORT	X340B3 3/8 Offset Short (1.448cm)	0.0	0.0	0.0	0.0			48.300	1.0	0.0	6.557	999.0	W/G	X340B3
9	LOAD	X301( ) Fixed Load					FIXED		0.0	1.0	0.0	6.557	999.0	W/G	FIXED[f]
10	LOAD	X313( ) or X314( ) Sliding Load					SLIDING		0.0	1.0	0.0	6.557	999.0	W/G	SLIDING[h]
11	THRU	Thru (0cm)							0.0	1.0	0.0	6.557	999.0	W/G	THRU[g]

a Open, short, load, delay/thru, or arbitrary impedance.
b Load or arbitrary impedance only.
c Arbitrary impedance only, device terminating impedance (defaults: short = 0 Ω, open = ∞ Ω, load = 50 Ω).
d Skin loss factor, normalized at 1 GHz.
e For waveguide, minimum frequency is same as F_{co}.
f Fixed terminations, model X301( ) series.
g Test ports connected directly.
h Sliding terminations, model X313( ) or X314( ) series.

Table 7. PNA Series Standard Definitions

Standard Class Assignments: Agilent PNA Series
Maury Software: X7005S17, WR90 Waveguide (8.2 to 12.4 GHz)
Cal Kit Name: X7005S, WR90 Waveguide Sliding Load Calibration Kit
Disk File Name: X7005S sliding.ckt

Class	A	B	C	D	E	F	G	Standard Class Label
$S_{11}A$	2							OPENS
$S_{11}B$	3							SHORTS
$S_{11}C$	9	10						LOADS
$S_{22}A$	2							OPENS
$S_{22}B$	3							SHORTS
$S_{22}C$	9	10						LOADS
Forward Transmission	11							THRU
Reverse Transmission	11							THRU
Forward Match	11							THRU
Reverse Match	11							THRU
Isolation	9							ISOL'N STD
TRL Thru								UNDEFINED
TRL Reflect								UNDEFINED
TRL Line								UNDEFINED
Adapter								UNDEFINED
TRL Option	Cal Zo: _____ System Zo					_____ Line Zo		
	Set Ref: _____ Thru					_____ Reflect		
	Lowband Frequency: _____							

Table 8

Standard Class Assignments: Agilent PNA Series
Maury Software: X7005S17, WR90 Waveguide (8.2 to 12.4 GHz)
Cal Kit Name: X7005S, WR90 Waveguide Fixed Load Calibration Kit
Disk File Name: X7005S fixed.ckt

Class	A	B	C	D	E	F	G	Standard Class Label
$S_{11}A$	2							OPENS
$S_{11}B$	3							SHORTS
$S_{11}C$	10	9						LOADS
$S_{22}A$	2							OPENS
$S_{22}B$	3							SHORTS
$S_{22}C$	10	9						LOADS
Forward Transmission	11							THRU
Reverse Transmission	11							THRU
Forward Match	11							THRU
Reverse Match	11							THRU
Isolation	9							ISOL'N STD
TRL Thru								UNDEFINED
TRL Reflect								UNDEFINED
TRL Line								UNDEFINED
Adapter								UNDEFINED
TRL Option	Cal Zo: _____ System Zo					_____ Line Zo		
	Set Ref: _____ Thru					_____ Reflect		
	Lowband Frequency: _____							

Table 9

Standard Definitions
Anritsu Calibration Kits

Waveguide Parameters	
- Identifier	X7005S
- Cutoff Frequency	6.557 GHz
- Offset Length of Short 1	4.830mm
- Offset Length of Short 2	1.448cm

Table 10. WR90 Waveguide Calibration Component Coefficients (Anritsu Analyzers)