

Agilent Technologies Z5623A Option K66

User's and Service Guide Supplement

Use this manual with the following documents:

PNA Series Network Analyzer On-line Help System

Application Note 1408-12



Agilent Technologies

Manufacturing Part Number: Z5623-90075

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WARNING	Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.
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Statement of Compliance

This product has been designed and tested in accordance with the standards listed on the Manufacturer's Declaration of Conformity, and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

Definitions

- Specifications describe the performance of parameters covered by the product warranty (temperature – 0 to 55 °C, unless otherwise noted.)
- *Typical* describes additional product performance information that is not covered by the product warranty. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range 20 to 30 °C. Typical performance does not include measurement uncertainty.
- *Nominal* values indicate expected performance, or describe product performance that is useful in the application of the product, but is not covered by the product warranty.

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General Information

Description

The Agilent Z5623AK66 is a 10 MHz to 20 GHz 10 Port Test Set that allows the user to do testing on a 14 port device when it is connected to the N5230A 4-Port PNA-L Series Network Analyzer.

The N5230A rear panel Test Set I/O 25 pin D-sub connector controls the Z5623AK66 Multiprot Test Set. The N5230A 4-Port PNA-L Series Network Analyzer has an Interface Control panel that will allow the user to send address and data to the multiprot test set. Information about the Interface Control can be found in the PNA on line help menu under Interface Control. N5230A PNA-L Series Network Analyzer information, Data sheets, white papers, or manuals can be viewed or printed by visiting our web site at <http://www.agilent.com/find/pna>.

Agilent does not supply accessories, such as the test port cables and DUT control cables, with the Z5623AK66.

Currently the PNA control supports Limited 4 port calibration. Couplers that share receivers cannot be part of the same 4 port measurement or calibration. Therefore, no fully calibrated or simultaneous measurements between the PNA ports and the Test Set ports. Also, no measurements can be made between the Test Set ports 5 thru 14.

The connectors on the front panel of the test set are 3.5 mm male.

Content List

Agilent Part Number	Description	Qty
Z5623-90075	User's and Service Guide Supplement	1
8120-6818	Test Set I/O Cable	1
Z5623-20418	Short Interconnect RF Access Jumpers	6
Z5623-20419	Long Interconnect RF Access Jumpers	6
5063-9235	Rack Mount Kit	1
5063-9228	Front Handle Kit	1
Z5623-20239	Rear Attach Bracket (Right)	1
Z5623-20240	Rear Attach Bracket (Left)	1
0515-0686	Screw, M4 x 0.7 (20 mm)	2
0515-1499	Screw, M3.5 x 0.6 (4 mm)	8
1600-1423	Lock-Link	4
3030-1240	Screw (0.5 in)	2

General Specifications

Power Requirements

Verify that the required ac power is available at all necessary locations before installing the Test Set to the PNA.

- Three-wire power cables (which provide a safety ground) must be used with all instruments.
- Air-conditioning equipment (or other motor-operated equipment) should not be placed on the same ac line that powers the Test Set and PNA.
- [Table 1](#) contains the maximum VA rating and BTU/hour rating for all instruments. This table can be use to determine the electrical and cooling requirements.

NOTE Values are based on 120 Vac supplied to each instrument at 60 Hz.

Table 1 Power Requirements

Standard Equipment		
Instrument	Maximum VA Rating	Maximum BTU/Hour
N5230A	350	1195
Z5623AK66	320	1095
Total	670	2290

Environmental Requirements

The environmental requirements of the system are listed in [Table 2](#). Note that these requirements are the same as those of the N5230A Network Analyzer with Option 245.

Table 2 Operating Environment

Temperature	
Operation	5 °C to 40 °C (41 °F to 104 °F)
Storage	–40 °C to +65 °C (–40 °F to +158 °F)
Measurement Calibration	20 °C to 26 °C (68 °F to 79 °F)
Performance Verification	Temperature must be within 1 °C (1.8 °F) of the temperature at which the measurement calibration was performed.
Relative Humidity	
Operation	5% to 95% at 40 °C or less (non-condensing)
Storage	5% to 95% at 65 °C or less (non-condensing)
Pressure Altitude (Operation or Storage)	Less than 3000 meters (~ 9,800 feet)

Equipment Heating and Cooling

If necessary, install air conditioning and heating to maintain the ambient temperature within the appropriate range. Air conditioning capacity must be consistent with the BTU ratings given in [Table 1](#).

Required Conditions for Accuracy Enhanced Measurement

Accuracy-enhanced (error-corrected) measurements require the ambient temperature of the PNA and Test Set to be maintained within ± 1 °C of the ambient temperature at calibration.

Dimensions and Space Requirements

Standard installation of the Z5623AK66 and PNA includes configuration and installation on a customer provided lab bench or table top of adequate size and strength.

Table 3 System Dimensions

Item	Weight
Required Bench Top Dimension:	
Clearance above the bench	43 cm (17 in)
Width	127 cm (50 in)
Depth	102 cm (40 in)
Weight	55 kg (110 lb)

Table 4 Instrument Dimensions

Model	Weight	Height	Width	Depth
N5230A	29 kg (7.5 lb ± 0.5 lb)	26.7 cm (10.5 in)	42.5 cm (16.7 in)	42.6 cm (16.8 in)
Z5623AK66	10 kg (22lb)	19.1 cm (7.5 in)	42.5 cm (16.7 in)	42.6 cm (16.8 in)

DUT Control Limits

Table 5 Control Limits

Item	Specifications
Connector Shape	15-pin female D-Sub
Voltage Range:	
Positive Input	0 to +5 V
Negative Input	-5 to 0 V
Maximum Current	100 mA in total of each line
Impedance	< 10 Ω
Range of Variable Voltage	+2 to +5 V

Maximum Power Levels

CAUTION It is recommend that you do not operate components near damage or maximum levels. The power levels should be kept at less than 3 dB, preferably 6 dB, below damage and maximum levels.

Table 6 Power Levels

Test Setup	Power Level
Maximum Z5623AK66 RF Power Levels for Access and Test Ports:	
CPLR ARM	+20 dbm 0 VDC
CPLR THRU	+20 dBm 0 VDC
RVCR B IN	+20 dBm 0 VDC
RVCR C IN	+20 dBm 0 VDC
RCVR D IN	+20 dBm 0 VDC
SOURCE IN	+20 dBm 0 VDC
PORT 5 thru PORT 14	+27 dBm 0 VDC
Maximum PNA-L RF Power Levels to Access and Test Ports:	
Max Recommended RF Level at A/B/C/D/R Receivers	- 15 dbm
Damage Level at A/B/C/D/R Receivers	+15 dbm
Max Recommended RF Level at Port 1, 2, 3, 4 Source	+0 dBm
Damage Level to Port 1, 2, 3, 4 Source Out	+20 dBm
Max Level to Port 1, 2, 3, 4 Test Ports	+20 dBm

NOTE Refer to your PNA-L specifications to optimize the power levels in the receivers.

NOTE Damage and maximum levels are not necessarily the optimum level.

Operation

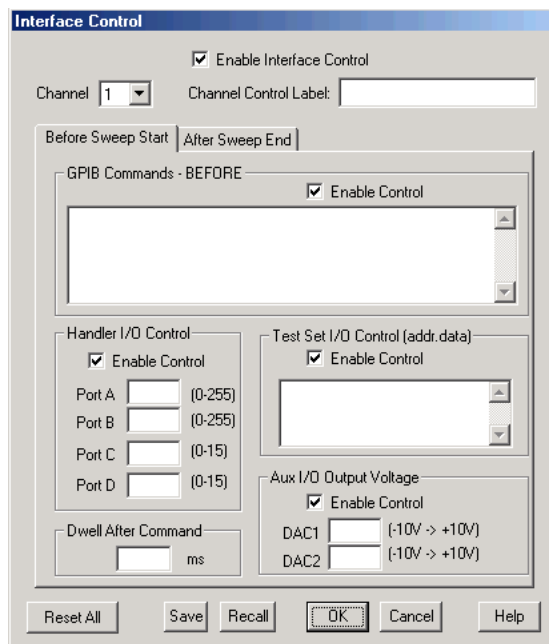
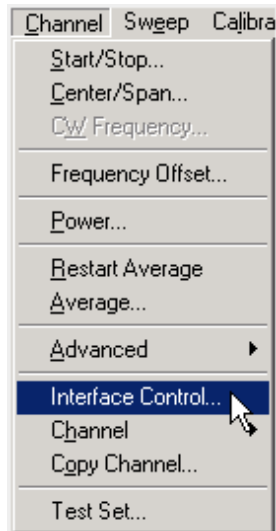
This section will describe how to setup and operate the Z5623A Option K66 Multiport Test Set with the N5230A 4-Port Series Network Analyzer.

The Agilent Z5623AK66 Multiport Test Set can be configured for many applications. Included in this document are two typical configurations:

- Agilent Z5623AK66 Shipped Configuration, see [Figure 1 on page 10](#).
- Agilent Z5623AK66 Setup Configuration, see [Figure 8 on page 16](#).

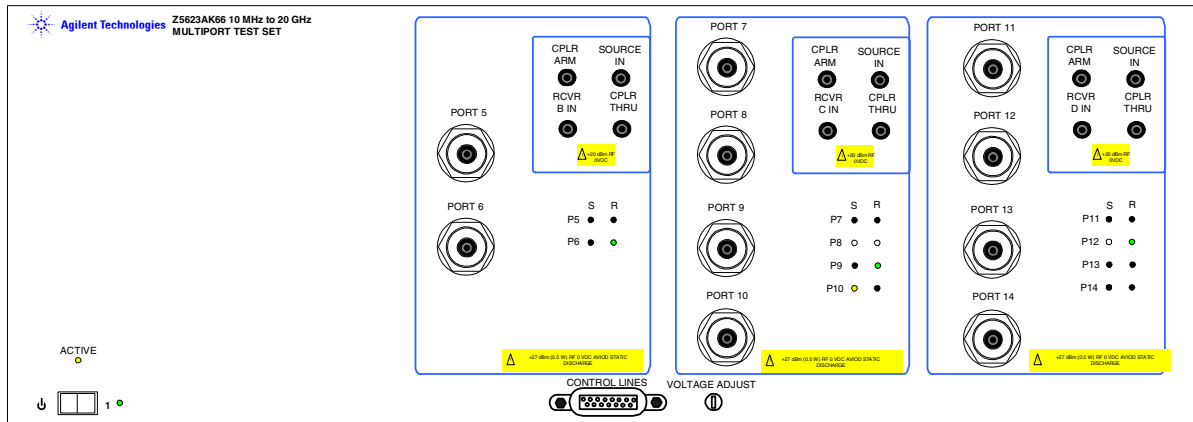
NOTE The internal firmware of the Agilent N5230A 4-Port PNA-L Series Network Analyzer has not been modified for this test set option. Power levels may differ from those indicated on the PNA when the Test Set is connected.

NOTE The N5230A 4-Port PNA-L Series Network Analyzer comes with the Interface Control application. Please review this application before connecting the Z5623AK66 Test Set to the PNA. Information regarding this application can be found in the PNA's Help Menu under "InterfaceControl". The application is shown below.



Z5623AK66 Multiport Test Set

Figure 1 Front Panel (Multiport Test Set)



Test Set Status LEDs

ACTIVE - On = the Test Set is being addressed. Off = Test Set is *not* being addressed. When the test set is first turned On the LED is Off.

S - On = the test port is the source. Off = source is connected to the PNA.

R - On = receiver is connected to the port. Off = receiver is connected to the PNA.

Port 5-6 and Access Ports - SMA (female)

CPLR ARM - B Channel Input from PNA port 2.

RCVR B IN - B Channel Output from the test set.

SOURCE IN - Test Port 2 Source Input from PNA.

CPLR THRU - Source Output to PNA Port 2 from Test Set switch.

Port 7-10 and Access Ports - SMA (female)

CPLR ARM - C Channel Input from PNA port 3.

RCVR C IN - C Channel Output from the test set.

SOURCE IN - Test Port 3 Source Input from PNA.

CPLR THRU - Source Output to PNA Port 3 from Test Set switch.

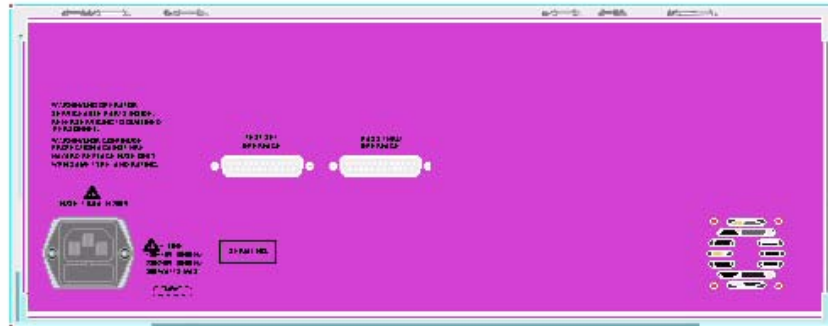
Port 11-14 and Access Ports - SMA (female)

CPLR ARM - D Channel Input from PNA port 4.

RCVR D IN - D Channel Output from the test set.

SOURCE IN - Test Port 4 Source Input from PNA.

CPLR THRU - Source Output to PNA Port 4 from Test Set switch.

Test Ports - 3.5 mm Bulkhead Test Ports (male)**PORT 5 to PORT 14.****Line Switch****Standby - OFF****1 - ON, Power LED On****DUT Control****CONTROL LINES** - 8 Lines that can supply voltage to assist in controlling a DUT.**VOLTAGE ADJUST** - Adjustment resistor to vary Pin 12 of the DUT CONTROL from 2 to 5 volts.**Figure 2 Rear Panel (Multiport Test Set)****Line Module**

The line fuse, as well as a spare, reside within the line module. [Figure 3](#) illustrates where the fuses are located and how to access them.

Available Fuses

- **United States (115 V orientation)**
Fuse (F 5 A/250V, 2110-0709) U.L. listed and CSA certified
- **Europe (230 V orientation)**
Fuse (F 5.0A/250V, 2110-0709) IEC listed and U.L. recognized certified

WARNING For continued protection against fire hazard replace line fuse only with same type and rating:

- **United States—F 5A/250V, Part Number 2110-0709**
- **Europe—F 5A/250V, Part Number 2110-0709**

The use of other fuses or material is prohibited.

Figure 3 Line Fuse



Test Set Interface

Connection to the PNA Test Set I/O connector or from Pass Thru Interface from another Test Set.

Pass Through Interface

Connection to another Test Set's, Test Set Interface.

System Setup

Attaching the Test Set to the PNA

This step is not necessary if you plan to place the Network Analyzer and Test Set in an equipment rack.

Preparing the Network Analyzer

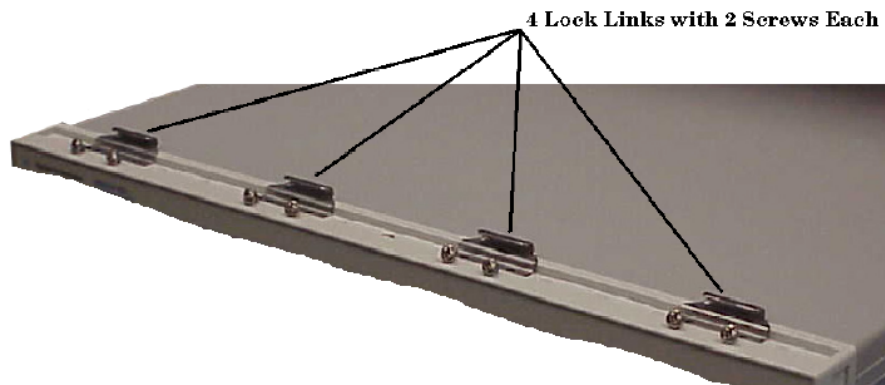
1. Remove feet from the bottom of the network analyzer.

Figure 4 Bottom Feet



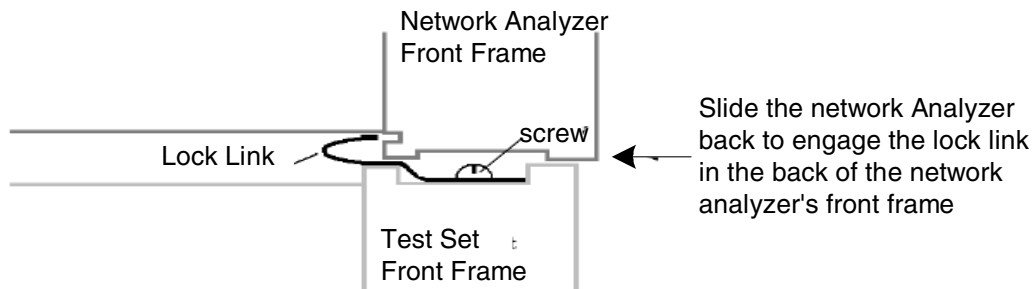
2. Remove screws (0515-1619) from the two lower rear panel standoffs.
3. Install the two rear locking feet where the standoffs were removed. Use rear brackets (Z5623-20239) on the right side and (Z5623-20240) on the left side of the analyzer. Use the two longer screws (0515-0686) to secure the feet to the analyzer.
4. Remove the front frame trim strip from Test Set.
5. Install the four lock links (1600-1423) on the top of the front frame, using 8 screws (0515-1499).

Figure 5 Lock Links



- Place the network analyzer on top of the Test Set and ensure that the front frame of the network analyzer is positioned slightly forward of the locks that are attached to the Test Set. Slide the network analyzer back so the locks engage the front frame of the analyzer.

Figure 6 Locking the Analyzer's



- Secure the network analyzer's lower locking feet to the Test Set upper locking feet, using two short screws (3030-1240), one on the each side of the instrument as shown [Figure 7](#). If the network analyzer's lower locking feet are not aligned with the screw holes in the Test Set's upper locking feet, loosen the screws securing the feet to the instrument slightly to align.

Figure 7 Locking Feet Screws



- Tighten all of the screws.

RF Cable Connections

Figure 8 on page 16 illustrates the setup configuration of the Z5623AK66 Multiport Test Set and how it should be configured to the N5230A 4-Port PNA-L Series Network Analyzer.

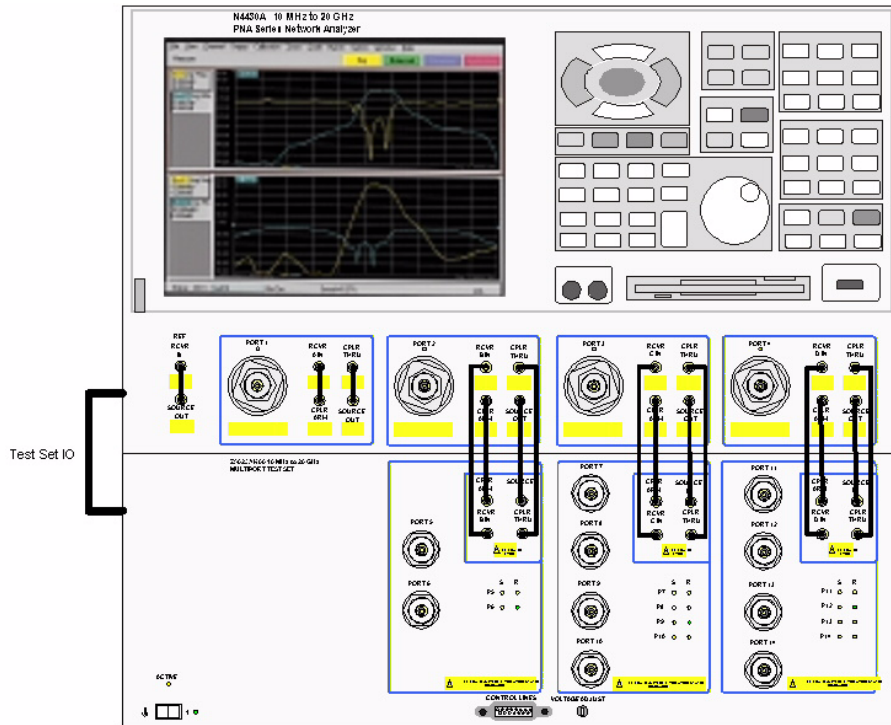
1. The RF cables supplied with this option connect between the N5230A 4-Port PNA-L Series Network Analyzer and the Z5623AK66 test set. Torque each cable to 8 in-lb. Connect the cables as listed in Table 7.

CAUTION Over torque will cause damage to the test set and may cause connectors to spin or become loose.

Table 7 Cable Connection

RF Cables	From (PNA)	To (Test Set)
Z5623-20418	Port 2 CPLR ARM	CPLR ARM
Z5623-20418	Port 2 SOURCE OUT	SOURCE IN
Z5623-20418	Port 3 CPLR ARM	CPLR ARM
Z5623-20418	Port 3 SOURCE OUT	SOURCE IN
Z5623-20418	Port 4 CPLR ARM	CPLR ARM
Z5623-20418	Port 4 SOURCE OUT	SOURCE IN
Z5623-20419	Port 2 RCVR B IN	RCVR B IN
Z5623-20419	Port 2 CPLR THRU	CPLR THRU
Z5623-20419	Port 3 RCVR C IN	RCVR C IN
Z5623-20419	Port 3 CPLR THRU	CPLR THRU
Z5623-20419	Port 4 RCVR D IN	RCVR D IN
Z5623-20419	Port 4 CPLR THRU	CPLR THRU

Figure 8 Z5623AK66 Setup Configuration



2. Connect the Test Set I/O cable (8120-6818) supplied from the PNA-L to the Z5623AK66 Test Set Interconnect on the rear panel. Do not connect this to the Z5623AK66 Pass Thru Interconnect.

DUT Control

Setting the Control Line

This section describes the electrical characteristics of the control line, connection to a DUT and an external dc power supply. For more information regarding the control lines refer to [Table 16 on page 45](#).

Pin Assignment

Figure 9 Pin Assignment for the Control Line

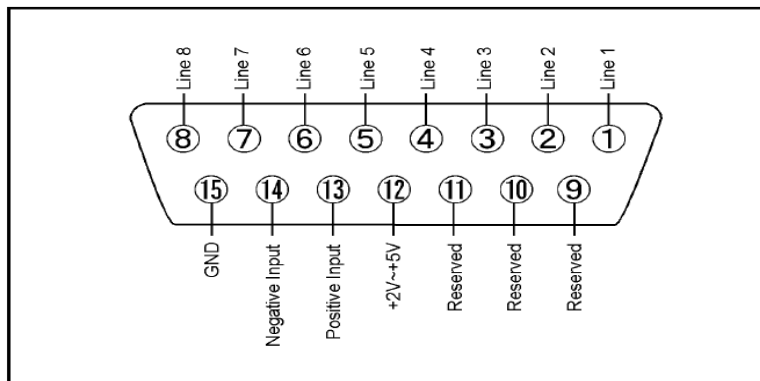
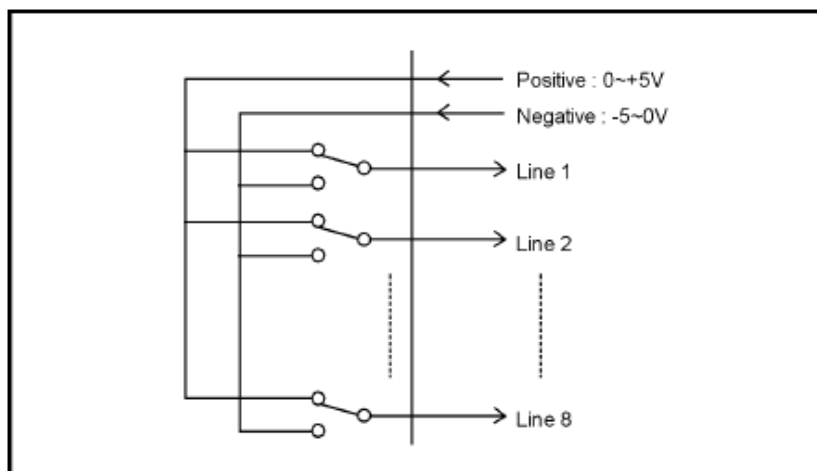


Table 8 Pin Assignment

Pin Number	Signal Name	Description
1	Line 1	output port of line 1
2	Line 2	output port of line 2
3	Line 3	output port of line 3
4	Line 4	output port of line 4
5	Line 5	output port of line 5
6	Line 6	output port of line 6
7	Line 7	output port of line 7
8	Line 8	output port of line 8
9		not used
10		not used
11		not used
12	+2 V to +5 V	The voltage input to pin 13. (The voltage can be varied by rotating the voltage adjustment trimmer on the front panel).
13	Positive Input	Input a signal that is outputted when each line is high from the pin 12 or external dc power supply.
14	Negative Input	Input a signal that is outputted when each line is low from the external dc power supply. Able to output 0 V as low from the each line by connecting to pin 15.
15	Gnd	ground terminal

Figure 10 Block Diagram of DUT Control**Table 9 Specifications**

Item	Specifications
Connector Shape	15-pin female D-Sub
Voltage Range:	
Positive Input	0 to +5 V
Negative Input	-5 to 0 V
Maximum Current	100 mA (in total of each line)
Impedance	< 10 Ω
Range of Variable Voltage	+2 to +5 V

Setting the Voltage of the Variable Voltage Output

The output voltage of pin 12 can be varied from +2 to +5 V. Perform the following procedure to set the voltage:

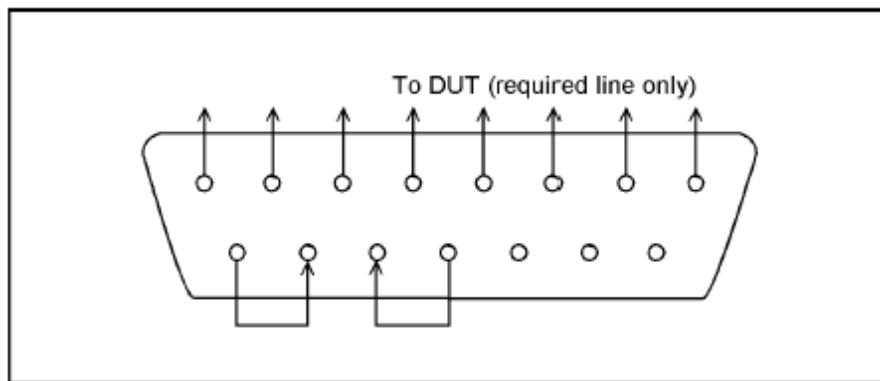
1. Turn On Z5623AK66.
2. Measure the voltage between pin 12 and 15 using a multimeter.
3. Rotate the voltage adjustment trimmer on the front panel until the multimeter indicates the appropriate voltage.

Connect to the DUT

Figure 11 illustrates an example of the connection between the DUT and the Z5623AK66 *without* an external dc power supply. Input the signals from pin 12 and 15 to the Positive Input and Negative Input respectively and connect each line to the control terminal of the DUT.

CAUTION The path that can be shorted is between pin 12-13 and the pin 14-15 only. Damage may result if any other path is short-circuited.

Figure 11 Connecting to the DUT



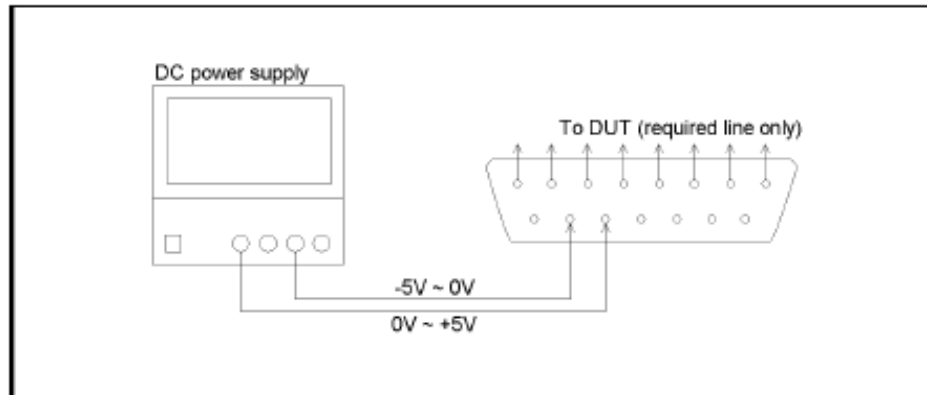
Connecting to the DUT With an External dc Power Supply

Figure 12 illustrates an example of the connection between the DUT and the Z5623AK66 with an external dc power supply. Input the High and Low signals from the external power supply to the Positive Input and Negative Input respectively, and connect each line to the control terminal of the DUT.

CAUTION Perform the procedure “Turning On the Z5623AK66 → Connecting the DUT → Turning on the external power supply”. Reverse the procedure to turn Off the Z5623K66. The Z5623AK66 may break down if a dc current is passed through it when it is turned Off.

CAUTION Do not short-circuit between the pins, it may cause damage.

Figure 12 Z5623AK66 to the DUT and External DC Power Supply



Controlling the Test Set

The Z5623AK66 Multiport Test Set is considered a “slave” instrument. The PNA-L must be used to control the Test Set. There are three methods to control the Test Set. Methods 1 and 2 will be explained in this manual.

- The PNA Interface Control.
- The PNA GPIB Command Processor.
- External Test Set I/O connector through SCPI and COM programming commands. Refer to the standard PNA manual.

Key Conventions

The following key conventions are used throughout this document.

- **[HARDKEYS]** are labeled front panel keys
- **SOFTKEYS** are unlabeled keys whose function is indicated on the instrument display

PNA Interface Control

The Interface Control feature allows remote commands and data to be sent to the following PNA rear-panel Interfaces: GPIB, Material Handler I/O, Test Set I/O, and Auxiliary I/O.

This section includes only the features required in the Interface Control for the Z5623AK66 Multiport Test Set. Applications and feature information, such as those listed below, can be found in the PNA’s Help Menu listed under “Interface Control.”

- Overview
- How to Access Interface Control Settings
- Interface Control Dialog Box

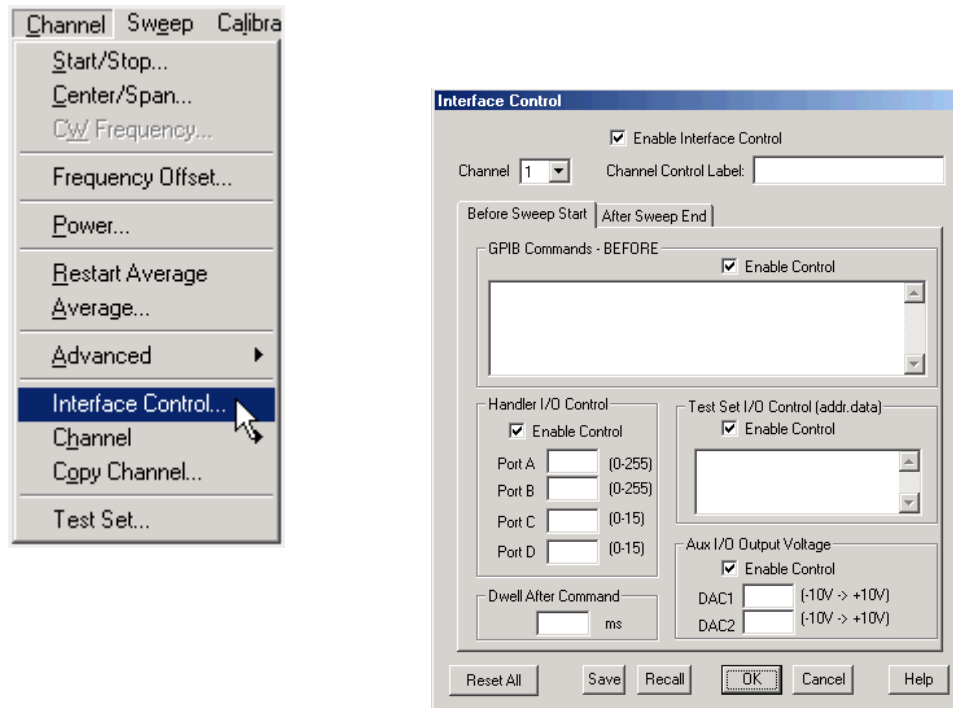
Other connectivity topics can be found in the PNA Series Network Analyzer’s help system.

Overview

The Interface Control feature also allows you to send data to control external equipment such as GPIB instrument, material handler, test set or other equipment without needing to create a remote program. The PNA manages the timing and required interface setup. Refer to “Rear Panel Tour” in the PNA Series Network Analyzer’s Help System.

- A unique set of control data can be sent for each channel. In addition, a unique set of control data can be sent before the channel sweep starts and after the sweep ends.
- Interface Control settings can be saved and recalled from the Interface Control Dialog Box or with Instrument State Save and Recall.
- Interface Control settings can be copied to other channels using Copy Channels.
- Control data can only be WRITTEN to the interfaces, NOT READ from the interfaces.
- Control data is sent in the following order and this order *cannot* be changed.
 1. GPIB Interface
 2. Material Handler Interface
 3. Test Set Interface
 4. Aux Interface
 5. Dwell Time

How to Access Interface Control Settings



NOTE While using Interface Control, the PNA must be in GPIB System Controller mode. Once this is complete you must restart the PNA application to go back to Talker/Listener.

Interface Control Dialog Box

An Instrument Preset will reset all of the fields to their default settings.

NOTE	If an error is encountered when sending Interface Control data, an error message is displayed on the PNA screen. The Channel Trigger State is set to Hold. You must fix the condition that caused the error, then change the Channel Trigger State to its original setting.
-------------	---

Enable Interface Control:

Enables and disables ALL Interface Control communication. When cleared (default setting) Interface Control is disabled and NO data is sent. To send data, the individual interfaces must also be enabled.

Channel:

Specifies the channel number for dialog settings. Each channel is configured individually. The list box illustrates the channels that currently have measurements. There must be at least one measurement present in order to make the settings.

Channel Label:

Specifies the label to be displayed on the PNA screen during the channel sweep.

Before Sweep Start- After Sweep End Tabs:

Commands /data for all four interfaces can be sent Before Sweep Start and After Sweep End. However, they are configured and enabled on separate tabs of the Interface Control Dialog Box. For example; to send GPIB commands Before and After a PNA sweep, the Enable Control check box must be selected and commands entered on both the Before Sweep Start and After Sweep End tabs.

Before Sweep Start:

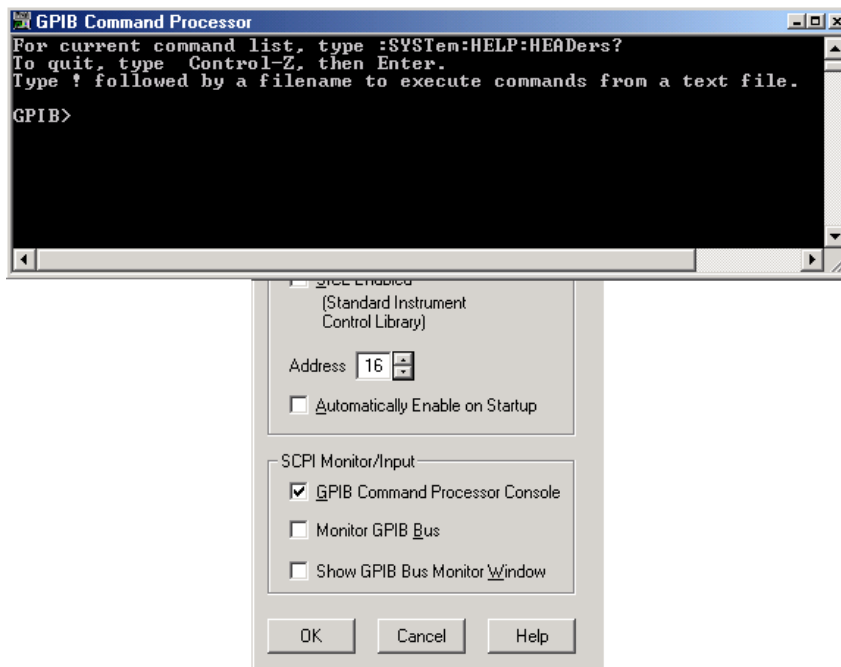
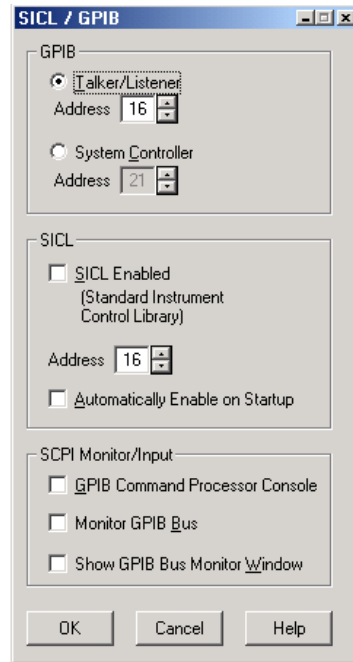
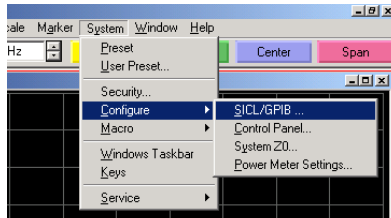
The data is sent before the first trace on the channel begins sweeping.

After Sweep End:

The data is sent after the last trace on the channel completes sweeping.

PNA GPIB Command Processor

To control the Z5623AK66 Test Set through the GPIB Command Processor press **[Menu/Dialog]** then tab to **System**, select **Configure > SICL/GPIB** and check the GPIB Command Processor Console box.



Write Commands

Once the GPIB Command Processor Console is open, commands can remotely control the external Test Set I/O connector by sending the following:

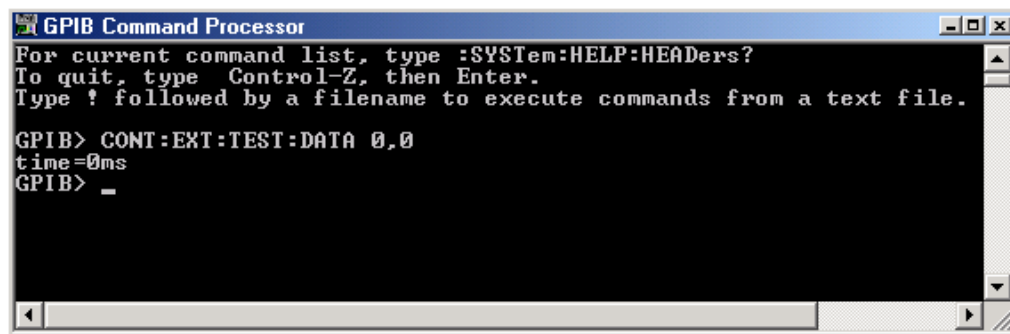
```
CONTRol:EXTernal:TESTset:DATA<addr>,<data>
```

Parameters:

<addr> Decimal equivalent of the 13 bit binary address

<data> Decimal equivalent of the 13 bit binary data

Example: CONT:EXT:TEST:DATA 0,0



```
GPIB Command Processor
For current command list, type :SYSTem:HELP:HEADers?
To quit, type Control-Z, then Enter.
Type ! followed by a filename to execute commands from a text file.

GPIB> CONT:EXT:TEST:DATA 0,0
time=0ms
GPIB> _
```

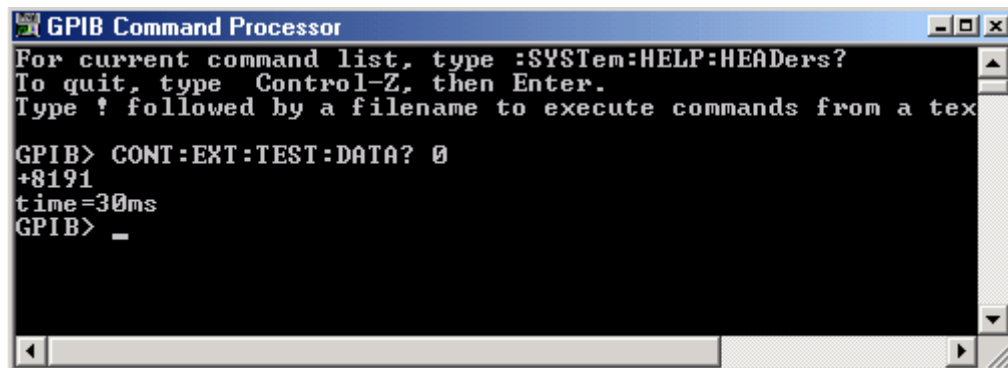
Read Commands

```
CONTRol:EXTernal:TESTset:DATA<addr>,<data>
```

Parameters:

<addr> Decimal equivalent of the 13 bit binary address

Example: CONT:EXT:TEST:DATA? 0



```
GPIB Command Processor
For current command list, type :SYSTem:HELP:HEADers?
To quit, type Control-Z, then Enter.
Type ! followed by a filename to execute commands from a text file.

GPIB> CONT:EXT:TEST:DATA? 0
+8191
time=30ms
GPIB> _
```

This command reads the decimal equivalent of the binary data from the specified address. The Option K66 decimal value is 66.

External Test Set I/O Control

Enable Control:

Enables and disables sending data out of the External Test Set I/O connector. This information can be found in the PNA Series Network Analyzer's Help System.

Multi-line Edit Control:

Each line contains a Write command using the following syntax:

address: any positive integer

value: any positive integer

Address and value are separated by a period, for example:

18.2

27.3

Entries should be separated by a new line or carriage return. The PNA front-panel **[Enter]** key inserts a new line into the field. All entries are sent out the External Test Set I/O using the WriteData Method. The number of entries is limited only by the available memory of the PNA.

Dwell After Command:

Specifies a wait time, in milliseconds, after all commands to all interfaces are sent. Any positive integer is allowed. This is used to allow all external devices to settle before beginning a measurement. An erratic trace could indicate that more settling time is necessary.

Reset All:

Sets all fields on all channels to their default values.

Save and Recall:

Saves and recalls the contents of the dialog box. If the Interface Control dialog box is populated with settings during an Instrument State Save, the settings are automatically recalled with the instrument state settings. Interface control uses an *.xml file type. An example file is stored on the PNA hard drive. You can recall it into the dialog, or you can open and edit it with a word processor, such as Word Pad.

OK:

Applies the settings and closes the dialog box.

Cancel:

Does not apply changes that were made and closes the dialog box.

NOTE Z5623AK66 Test Set I/O Commands can be found in [Table 10 on page 29](#) through [Table 16 on page 45](#). The Address and Data commands can be entered into the Test Set I/O control.

Test Set I/O Interface Commands

Switch Address and Data

Table 10 and Table 11 contain the information to set the internal switch paths of the Z5623AK66 Test Set.

NOTE All switches must be set with each command sent.

Table 10 PNA Port 2 and Test Set Ports 5 and 6

Address	Data	Data AD7-AD0	Description					Bit Data		
0		00000xxB	Bit 0 controls S101; Source to PNA or Test Set; 0=PNA; 1=Test Set					0,1		
0		00000Bxx	Bit 1 controls S102; Select Port 5 or 6; 0=5; 1=6					0,1		
0		00000xBx	Bit 2 controls S103; Receiver to PNA or Test Set; 0=PNA; 1=Test Set					0,1		
Switch Number								S103	S102	S101
Test Set I/O Bits			AD7	AD6	AD5	AD4	AD3	AD2	AD1	AD0
Bit Decimal Equivalent			128	64	32	16	8	4	2	1
Example 1 Data = 0			0	0	0	0	0	0	0	0
Example 2 Data = 5			0	0	0	0	0	1	0	1
X indicates unknown user bit state										
B indicates bit of interest										
There are 8 individual switch combinations for the Z5623AK66 Port 5 & 6 and Port 2 of the PNA. To select a test set switch configuration, all 3 switches must be set. To do this you must add AD7 to AD0 binary number and convert this to a decimal equivalent.										

NOTE The highlighted areas are the strategic commands.

Table 11 Address and Data for PNA Port 2 and Test Set Ports 5 and 6

Address	Data	Data AD7-AD0	Description
0	0	00000000	Selects the Port 2 as the source and receiver port. Port 5 term in S101 and receiver term in S103. Port 6 term in S102.
0	1	00000001	Selects the Port 2 as the receiver and Port 5 as the source. PNA Port 2 term in S101. Port 5 receiver term in S103. Port 6 term in S102.
0	2	00000010	Selects the Port 2 as the source and receiver port. Port 5 term in S102 and receiver term in S103. Port 6 term in S101.
0	3	00000011	Selects the Port 2 as the receiver and Port 6 as the source. Port 2 term in S101. Port 5 term in S102 and receiver term in S103.
0	4	00000100	Selects the Port 2 as the source and Port 5 as the receiver. Port 5 term in S101. Port 2 receiver term in S103. Port 6 term in S102.
0	5	00000101	Selects the Port 5 as the source and receiver port. Port 2 term in S101 and receiver term in S103. Port 6 term in S102.
0	6	00000110	Selects the PNA Port 2 as the source and Port 6 as the receiver port. PNA Port 2 receiver term in S103. Port 5 term in S102. Port 6 term in S101.
0	7	00000111	Selects Port 6 as the source and receiver. Port 2 term in S101 and receiver term in S103. Port 5 term in S102.

Table 12 PNA Port 3 and Test Set Ports 7 Through 10

Address	Data	Data AD7-AD0	Description						Bit Data	
16		00xxxxxB	Bit 0 controls S201; Source to PNA or Test Set; 0=PNA; 1=Test Set						0,1	
16		00xxxxBx	Bit 1 controls S202; Source select Port (7, 8) or (9,10); 0=(7, 8); 1=(9, 10)						0,1	
16		00xxxBxx	Bit 2 controls S203; Select Port 7 or 8; 0=7; 1=8						0,1	
16		00xxBxxx	Bit 3 controls S204; Select Port 9 or 10; 0=9; 1=10						0,1	
16		00xBxxxx	Bit 4 controls S205; Receiver to PNA or Test Set; 0=PNA; 1=Test Set						0,1	
16		00Bxxxxx	Bit 5 controls S206; Receiver select for Ports (7, 8) or (9, 10); 0=(7,8); 1=(9,10)						0,1	
Switch Number					S206	S205	S204	S203	S202	S201
Test Set I/O Bits			AD7	AD6	AD5	AD4	AD3	AD2	AD1	AD0
Bit Decimal Equivalent			128	64	32	16	8	4	2	1
Example 1 Data = 0			0	0	0	0	0	0	0	0
Example 2 Data = 5			0	0	1	0	0	1	1	0
X indicates unknown user bit state										
B indicates bit of interest										
There are 62 individual switch combinations for the Z5623AK66 Port 7 through 10 and Port 3 of the PNA. To select a test set switch configuration, all 6 switches must be set. To do this you must add AD7 to AD0 binary number and convert this to a decimal equivalent.										

Table 13 Address and Data for PNA Port 3 and Test Set Ports 7 through 10

Address	Data	Data AD7-AD0	Description
16	0	00000000	Selects the Port 3 as the source and receiver port. Port 7 term in S201 and receiver term in S205. Port 8 term in S203. Port 9 term in S202 and receiver term in S206. Port 10 term in S204.
16	1	00000001	Selects the Port 7 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 receiver term in S205. Port 8 term in S203. Port 9 term in S202 and receiver term in S206. Port 10 term in S204.
16	2	00000010	Selects the Port 3 as the source and receiver port. Port 7 term in S202 and receiver term in S205. Port 8 term in S203. Port 9 term in S201 and receiver term in S206. Port 10 term in S204.
16	3	00000011	Selects the Port 9 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S202 and receiver term in S205. Port 8 term in S203. Port 9 receiver term in S206. Port 10 term in S204.
16	4	00000100	Selects the Port 3 as the source and receiver port. Port 7 term in S203. Port 8 term in S201 and receiver term in S205. Port 9 term in S202 and receiver term in S206. Port 10 term in S204.
16	5	00000101	Selects the Port 8 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S203. Port 8 receiver term in S205. Port 9 term in S202 and receiver term in S206. Port 10 term in S204.
16	6	00000110	Selects the Port 3 as the source and receiver port. Port 7 term in S203. Port 8 term in S202 and receiver term in S205. Port 9 term in S201 and receiver term in S206. Port 10 term in S204.
16	7	00000111	Selects the Port 9 as the source and Port 3 as the receiver. Port 3 term in S201. Port 7 term in S203. Port 8 term in S202 and receiver term in S205. Port 9 receiver term in S206. Port 10 term in S204.
16	8	00001000	Selects the Port 3 as the source and receiver port. Port 7 term in S201 and receiver term in S205. Port 8 term in S203. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	9	00001001	Selects the Port 7 as the source and Port 3 as the receiver. Port 3 term in S201. Port 7 receiver term in S205. Port 8 term in S203. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	10	00001010	Selects the Port 3 as the source and receiver port. Port 7 term in S202 and receiver term in S205. Port 8 term in S203. Port 9 term in S204. Port 10 term in S201 and receiver term in S206.
16	11	00001011	Selects the Port 10 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S202 and receiver term in S205. Port 8 term in S203. Port 9 term in S204. Port 10 receiver term in S206.

Table 13 Address and Data for PNA Port 3 and Test Set Ports 7 through 10

16	12	00001100	Selects the Port 3 as the source and receiver port. Port 7 term in S203 and receiver term in S205. Port 8 term in S201. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	13	00001101	Selects the Port 8 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S203. Port 8 receiver term in S205. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	14	00001110	Selects the Port 3 as the source and receiver port. Port 7 term in S203. Port 8 term in S201 and receiver term in S205. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	15	00001111	Selects the Port 10 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S203. Port 8 term in S202 and receiver term in S205. Port 9 term in S204. Port 10 receiver term in S206.
16	16	00010000	Selects Port 3 as the source and port 7 as the receiver. Port 3 receiver term in S205. Port 7 term in S201. Port 8 term in S203. Port 9 term in S202 and receiver interm in S206. Port 10 term in S204.
16	17	00010001	Selects Port 7 as the source and receiver. Port 3 term in S201 and receiver term in S205. Port 8 term in S203. Port 9 term in S202 and receiver in term S206. Port 10 term in S204.
16	18	00010010	Selects Port 3 as the source and Port 7 as the receiver. Port 3 receiver term in S205. Port 7 term in S202. Port 8 term in S203. Port 9 term in S201 and receiver term S206. Port 10 term in S204.
16	19	00010011	Selects Port 9 as the source and Port 7 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S202. Port 8 term in S203. Port 9 receiver term in S206. Port 10 term in S204.
16	20	00010100	Selects Port 3 as the source and Port 8 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S201. Port 9 term in S202 and receiver term in S206. Port 10 term in S204.
16	21	00010101	Selects Port 8 as the source and receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 9 term in S202 and receiver term in S206. Port 10 term in S204.
16	22	00010110	Selects Port 3 as the source and Port 8 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S202. Port 9 term in S201 and receiver term in S206. Port 10 term in S204.
16	23	00010111	Select Port 9 as the source and Port 8 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 8 term in S202. Port 9 receiver term in S206. Port 10 term in S204.

Table 13 Address and Data for PNA Port 3 and Test Set Ports 7 through 10

16	24	00011000	Selects Port 3 as the source and Port 7 as the receiver. Port 3 receiver term in S205. Port 7 term in S201. Port 8 term in S203. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	25	00011001	Selects Port 7 as the source and receiver. Port 3 term in S201 and receiver term in S205. Port 8 term in S203. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	26	00011010	Selects Port 3 as the source and Port 7 as the receiver. Port 3 receiver term in S205. Port 7 term in S202. Port 8 term in S203. Port 9 term in S204. Port 10 term in S201 and receiver term in S206.
16	27	00011011	Selects Port 10 as the source and Port 7 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S202. Port 8 term in S203. Port 9 term in S204. Port 10 receiver term in S206.
16	28	00011100	Selects Port 3 as the source and Port 8 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S201. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	29	00011101	Selects Port 8 as the source and the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 9 term in S204. Port 10 term in S202 and receiver term in S206.
16	30	00011110	Selects Port 3 as the source and Port 8 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S202. Port 9 term in S204. Port 10 term in S201 and receiver term in S206.
16	31	00011111	Selects Port 10 as the source and Port 8 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 8 term in S202. Port 9 term in S204. Port 10 receiver term in S206.
16	32	00100000	Selects the Port 3 as the source and receiver port. Port 7 term in S201 and receiver term in S206. Port 8 term in S203. Port 9 term in S202. Port 10 term in S204 and receiver term in S205.
16	33	00100001	Selects the Port 7 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 receiver term in S206. Port 8 term in S203. Port 9 term in S202. Port 10 term in S204 and receiver term in S205.
16	34	00100010	Selects the Port 3 as the source and receiver port. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 9 term in S201 and receiver term in S205. Port 10 term in S204.
16	35	00100011	Selects the Port 9 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 9 receiver term in S205. Port 10 term in S204.
16	36	00100100	Selects the Port 3 as the source and receiver port. Port 7 term in S203. Port 8 term in S201 and receiver term in S206. Port 9 term in S202 and receiver term in S205. Port 10 term in S204.

Table 13 Address and Data for PNA Port 3 and Test Set Ports 7 through 10

16	37	00100101	Selects the Port 8 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S203. Port 8 receiver term in S206. Port 9 term in S202 and receiver term in S205. Port 10 term in S204.
16	38	00100110	Selects the Port 3 as the source and receiver port. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 9 term in S201 and receiver term in S205. Port 10 term in S204.
16	39	00100111	Selects the Port 9 as the source and Port 3 as the receiver. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 9 receiver term in S205. Port 10 term in S204.
16	40	00101000	Selects the Port 3 as the source and receiver port. Port 7 term in S201 and receiver term in S206. Port 8 term in S203. Port 9 term in S202. Port 10 term in S204 and receiver term in S205.
16	41	00101001	Selects the Port 7 as the source and Port 3 as the receiver. Port 3 term in S201. Port 7 receiver term in S206. Port 8 term in S203. Port 9 term in S204. Port 10 term in S202 and receiver term in S205.
16	42	00101010	Selects the Port 3 as the source and receiver port. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 9 term in S204. Port 10 term in S201 and receiver term in S205.
16	43	00101011	Selects the Port 10 as the source and Port 3 as the receiver. Port 3 term in S201. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 9 term in S204. Port 10 receiver term in S205.
16	44	00101100	Selects the Port 3 as the source and receiver port. Port 7 term in S203 and receiver term in S206. Port 8 term in S201. Port 9 term in S204. Port 10 term in S202 and receiver term in S205.
16	45	00101101	Selects the Port 8 as the source and Port 3 as the receiver. PNA Port 3 term in S201. Port 7 term in S203. Port 8 receiver term in S206. Port 9 term in S204. Port 10 term in S202 and receiver term in S205.
16	46	00101110	Selects the Port 3 as the source and receiver port. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 9 term in S204. Port 10 term in S201 and receiver term in S205.
16	47	00101111	Selects the Port 10 as the source and Port 3 as the receiver. Port 3 term in S201. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 9 term in S204. Port 10 receiver term in S205.
16	48	00110000	Selects Port 3 as the source and Port 9 as the receiver. Port 3 receiver term in S205. Port 7 term in S201 and receiver term in S206. Port 8 term in S203. Port 9 term in S202. Port 10 term in S204.
16	49	00110001	Selects Port 7 as the source and Port 9 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 receiver term in S206. Port 8 term in S203. Port 9 term in S202. Port 10 term in S204.

Table 13 Address and Data for PNA Port 3 and Test Set Ports 7 through 10

16	50	00110010	Selects Port 3 as the source and Port 9 as the receiver. Port 3 receiver term in S205. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 9 term in S201. Port 10 term in S204.
16	51	00110011	Selects Port 9 as the source and receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 10 term in S204.
16	52	00110100	Selects Port 3 as the source and Port 9 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S201 and receiver term in S206. Port 9 term in S202. Port 10 term in S204.
16	53	00110101	Select Port 8 as the source and Port 9 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 8 receiver term in S206. Port 9 term in S202 and receiver term in S205. Port 10 term in S204.
16	54	00110110	Selects Port 3 as the source and Port 9 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 9 term in S201. Port 10 term in S204.
16	55	00110111	Select Port 9 as the source and receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 10 term in S204.
16	56	00111000	Selects Port 3 as the source and Port 10 as the receiver. Port 3 receiver term in S205. Port 7 term in S201 and receiver term in S206. Port 8 term in S203. Port 9 term in S204. Port 10 term in S202.
16	57	00111001	Select Port 7 as the source and Port 10 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 receiver term in S206. Port 8 term in S203. Port 9 term in S204. Port 10 term in S202.
16	58	00111010	Selects Port 3 as the source and Port 10 as the receiver. Port 3 receiver term in S205. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 9 term in S204. Port 10 term in S201.
16	59	00111011	Selects Port 10 as the source and the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S202 and receiver term in S206. Port 8 term in S203. Port 9 term in S204.
16	60	00111100	Selects Port 3 as the source and Port 10 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S201 and receiver term in S206. Port 9 term in S204. Port 10 term in S202.
16	61	00111101	Selects Port 8 as the source and Port 10 as the receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 8 receiver term in S206. Port 9 term in S204. Port 10 term in S202.

Table 13 Address and Data for PNA Port 3 and Test Set Ports 7 through 10

16	62	00111110	Selects Port 3 as the source and Port 10 as the receiver. Port 3 receiver term in S205. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 9 term in S204. Port 10 term in S201.
16	63	00111111	Selects Port 10 as source and receiver. Port 3 term in S201 and receiver term in S205. Port 7 term in S203. Port 8 term in S202 and receiver term in S206. Port 9 term in S204.

Table 14 PNA Port 4 and Test Set Ports 11 through 14

Address	Data	Data AD11-AD0	Description						Bit Data	
32		00xxxxxB	Bit 0 controls S301; Source to PNA or Test Set; 0=PNA; 1=Test Set						0,1	
32		00xxxxBx	Bit 1 controls S302; Source select Port (11, 12) or (13, 14); 0=(11, 12); 1=(13, 14)						0,1	
32		00xxxBxx	Bit 2 controls S303; Select Port 11 or 12; 0=11; 1=12						0,1	
32		00xxBxxx	Bit 3 controls S304; Select Port 13 or 14; 0=13; 1=14						0,1	
32		00xBxxxx	Bit 4 controls S305; Receiver to PNA or Test Set; 0=PNA; 1=Test Set						0,1	
32		00Bxxxxx	Bit 5 controls S306; Receiver select for Ports (11, 12) or (13, 14); 0=(11, 12); 1=(13, 14)						0,1	
Switch Number					S306	S305	S304	S303	S302	S301
Test Set I/O Bits			AD7	AD6	AD5	AD4	AD3	AD2	AD1	AD0
Bit Decimal Equivalent			128	64	32	16	12	4	2	1
Example 1 Data = 0			0	0	0	0	0	0	0	0
Example 2 Data = 38			0	0	1	0	0	1	1	0
X indicates unknown user bit state										
B indicates bit of interest										
<p>There are 62 individual switch combinations for the Z5623AK66 Port 11 through 14 and Port 4 of the PNA. To select a test set switch configuration, all 6 switches must be set. To do this you must add AD11 to AD0 binary number and convert this to a decimal equivalent.</p>										

Table 15 Address and Data for PNA Port 4 and Test Set Ports 11 through 14

Address	Data	Data AD7-AD0	Description
32	0	00000000	Selects the Port 4 as the source and receiver port. Port 11 term in S301 and receiver term in S305. Port 12 term in S303. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	1	00000001	Selects the Port 11 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 receiver term in S305. Port 12 term in S303. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	2	00000010	Selects the Port 4 as the source and receiver port. Port 11 term in S302 and receiver term in S305. Port 12 term in S303. Port 13 term in S301 and receiver term in S306. Port 14 term in S304.
32	3	00000011	Selects the Port 13 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S302 and receiver term in S305. Port 12 term in S303. Port 13 receiver term in S306. Port 14 term in S304.
32	4	00000100	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S301 and receiver term in S305. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	5	00000101	Selects the Port 12 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 receiver term in S305. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	6	00000110	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S302 and receiver term in S305. Port 13 term in S301 and receiver term in S306. Port 14 term in S304.
32	7	00000111	Selects the Port 13 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 term in S302 and receiver term in S305. Port 13 receiver term in S306. Port 14 term in S304.
32	8	00001000	Selects the Port 4 as the source and receiver port. Port 11 term in S301 and receiver term in S305. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	9	00001001	Selects the Port 11 as the source and Port 4 as the receiver. Port 4 term in S301. Port 11 receiver term in S305. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	10	00001010	Selects the Port 4 as the source and receiver port. Port 11 term in S302 and receiver term in S305. Port 12 term in S303. Port 13 term in S304. Port 14 term in S301 and receiver term in S306.

Table 15 Address and Data for PNA Port 4 and Test Set Ports 11 through 14

32	11	00001011	Selects the Port 14 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S302 and receiver term in S305. Port 12 term in S303. Port 13 term in S304. Port 14 receiver term in S306.
32	12	00001100	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S301 and receiver term in S305. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	13	00001101	Selects the Port 12 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 receiver term in S305. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	14	00001110	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S302 and receiver term in S305. Port 13 term in S304. Port 14 term in S301 and receiver term in S306.
32	15	00001111	Selects the Port 14 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 term in S302 and receiver term in S305. Port 13 term in S304. Port 14 receiver term in S306.
32	16	00010000	Selects Port 4 as the source and Port 11 as the receiver. Port 4 receiver term in S305. Port 11 term in S301. Port 12 term in S303. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	17	00010001	Selects Port 11 as the source and receiver. Port 4 term in S301 and receiver term in S305. Port 12 term in S303. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	18	00010010	Selects Port 4 as the source and Port 11 as the receiver. Port 4 receiver term in S305. Port 11 term in S302. Port 12 term in S303. Port 13 term in S301 and receiver term in S306. Port 14 term in S304.
32	19	00010011	Selects Port 13 as the source and Port 11 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S302. Port 12 term in S303. Port 13 receiver term in S306. Port 14 term in S304.
32	20	00010100	Selects Port 4 as the source and Port 12 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S301. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	21	00010101	Selects Port 12 as the source and receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 13 term in S302 and receiver term in S306. Port 14 term in S304.
32	22	00010110	Selects Port 4 as the source and Port 12 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S302. Port 13 term in S301 and receiver term in S306. Port 14 term in S304.

Table 15 Address and Data for PNA Port 4 and Test Set Ports 11 through 14

32	23	00010111	Select Port 13 as the source and Port 12 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 12 term in S302. Port 13 receiver term in S306. Port 14 term in S304.
32	24	00011000	Selects Port 4 as the source and Port 11 as the receiver. Port 4 receiver term in S305. Port 11 term in S301. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	25	00011001	Selects Port 11 as the source and receiver. Port 4 term in S301 and receiver term in S305. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	26	00011010	Selects Port 4 as the source and Port 11 as the receiver. Port 4 receiver term in S305. Port 11 term in S302. Port 12 term in S303. Port 13 term in S304. Port 14 term in S301 and receiver term in S306.
32	27	00011011	Selects Port 14 as the source and Port 11 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S302. Port 12 term in S303. Port 13 term in S304. Port 14 receiver term in S306.
32	28	00011100	Selects Port 4 as the source and Port 12 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S301. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	29	00011101	Selects Port 12 as the source and the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 13 term in S304. Port 14 term in S302 and receiver term in S306.
32	30	00011110	Selects Port 4 as the source and Port 12 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S302. Port 13 term in S304. Port 14 term in S301 and receiver term in S306.
32	31	00011111	Selects Port 14 as the source and Port 12 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 12 term in S302. Port 13 term in S304. Port 14 receiver term in S306.
32	32	00100000	Selects the Port 4 as the source and receiver port. Port 11 term in S301 and receiver term in S306. Port 12 term in S303. Port 13 term in S302 and receiver term in S305. Port 14 term in S304.
32	33	00100001	Selects the Port 11 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 receiver term in S306. Port 12 term in S303. Port 13 term in S302 and receiver term in S305. Port 14 term in S304.
32	34	00100010	Selects the Port 4 as the source and receiver port. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 13 term in S301 and receiver term in S305. Port 14 term in S304.

Table 15 Address and Data for PNA Port 4 and Test Set Ports 11 through 14

32	35	00100011	Selects the Port 13 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 13 receiver term in S305. Port 14 term in S304.
32	36	00100100	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S301 and receiver term in S306. Port 13 term in S302 and receiver term in S305. Port 14 term in S304.
32	37	00100101	Selects the Port 12 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 receiver term in S306. Port 13 term in S302 and receiver term in S305. Port 14 term in S304.
32	38	00100110	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 13 term in S301 and receiver term in S305. Port 14 term in S304.
32	39	00100111	Selects the Port 13 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 13 receiver term in S305. Port 14 term in S304.
32	40	00101000	Selects the Port 4 as the source and receiver port. Port 11 term in S301 and receiver term in S306. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302 and receiver term in S305.
32	41	00101001	Selects the Port 11 as the source and Port 4 as the receiver. Port 4 term in S301. Port 11 receiver term in S306. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302 and receiver term in S305.
32	42	00101010	Selects the Port 4 as the source and receiver port. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 13 term in S304. Port 14 term in S301 and receiver term in S305.
32	43	00101011	Selects the Port 14 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 13 term in S304. Port 14 receiver term in S305.
32	44	00101100	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S301 and receiver term in S306. Port 13 term in S304. Port 14 term in S302 and receiver term in S305.
32	45	00101101	Selects the Port 12 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 receiver term in S306. Port 13 term in S304. Port 14 term in S302 and receiver term in S305.

Table 15 Address and Data for PNA Port 4 and Test Set Ports 11 through 14

32	46	00101110	Selects the Port 4 as the source and receiver port. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 13 term in S304. Port 14 term in S301 and receiver term in S305.
32	47	00101111	Selects the Port 14 as the source and Port 4 as the receiver. PNA Port 4 term in S301. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 13 term in S304. Port 14 receiver term in S305.
32	48	00110000	Selects Port 4 as the source and Port 13 as the receiver. Port 4 receiver term in S305. Port 11 term in S301 and receiver term in S306. Port 12 term in S303. Port 13 term in S302. Port 14 term in S304.
32	49	00110001	Selects Port 11 as the source and Port 13 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 receiver term in S306. Port 12 term in S303. Port 13 term in S302. Port 14 term in S304.
32	50	00110010	Selects Port 4 as the source and Port 13 as the receiver. Port 4 receiver term in S305. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 13 term in S301. Port 14 term in S304.
32	51	00110011	Selects Port 13 as the source and receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 14 term in S304.
32	52	00110100	Selects Port 4 as the source and Port 13 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S301 and receiver term in S306. Port 13 term in S302. Port 14 term in S304.
32	53	00110101	Select Port 12 as the source and Port 13 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 12 receiver term in S306. Port 13 term in S302 and receiver term in S305. Port 14 term in S304.
32	54	00110110	Selects Port 4 as the source and Port 13 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 13 term in S301. Port 14 term in S304.
32	55	00110111	Select Port 13 as the source and receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 14 term in S304.
32	56	00111000	Selects Port 4 as the source and Port 14 as the receiver. Port 4 receiver term in S305. Port 11 term in S301 and receiver term in S306. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302.
32	57	00111001	Select Port 11 as the source and Port 14 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 receiver term in S306. Port 12 term in S303. Port 13 term in S304. Port 14 term in S302.

Table 15 Address and Data for PNA Port 4 and Test Set Ports 11 through 14

32	58	00111010	Selects Port 4 as the source and Port 14 as the receiver. Port 4 receiver term in S305. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 13 term in S304. Port 14 term in S301.
32	59	00111011	Selects Port 14 as the source and the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S302 and receiver term in S306. Port 12 term in S303. Port 13 term in S304.
32	60	00111100	Selects Port 4 as the source and Port 14 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S301 and receiver term in S306. Port 13 term in S304. Port 14 term in S302.
32	61	00111101	Selects Port 12 as the source and Port 14 as the receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 12 receiver term in S306. Port 13 term in S304. Port 14 term in S302.
32	62	00111110	Selects Port 4 as the source and Port 14 as the receiver. Port 4 receiver term in S305. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 13 term in S304. Port 14 term in S301.
32	63	00111111	Selects Port 14 as source and receiver. Port 4 term in S301 and receiver term in S305. Port 11 term in S303. Port 12 term in S302 and receiver term in S306. Port 13 term in S304.

Control Lines

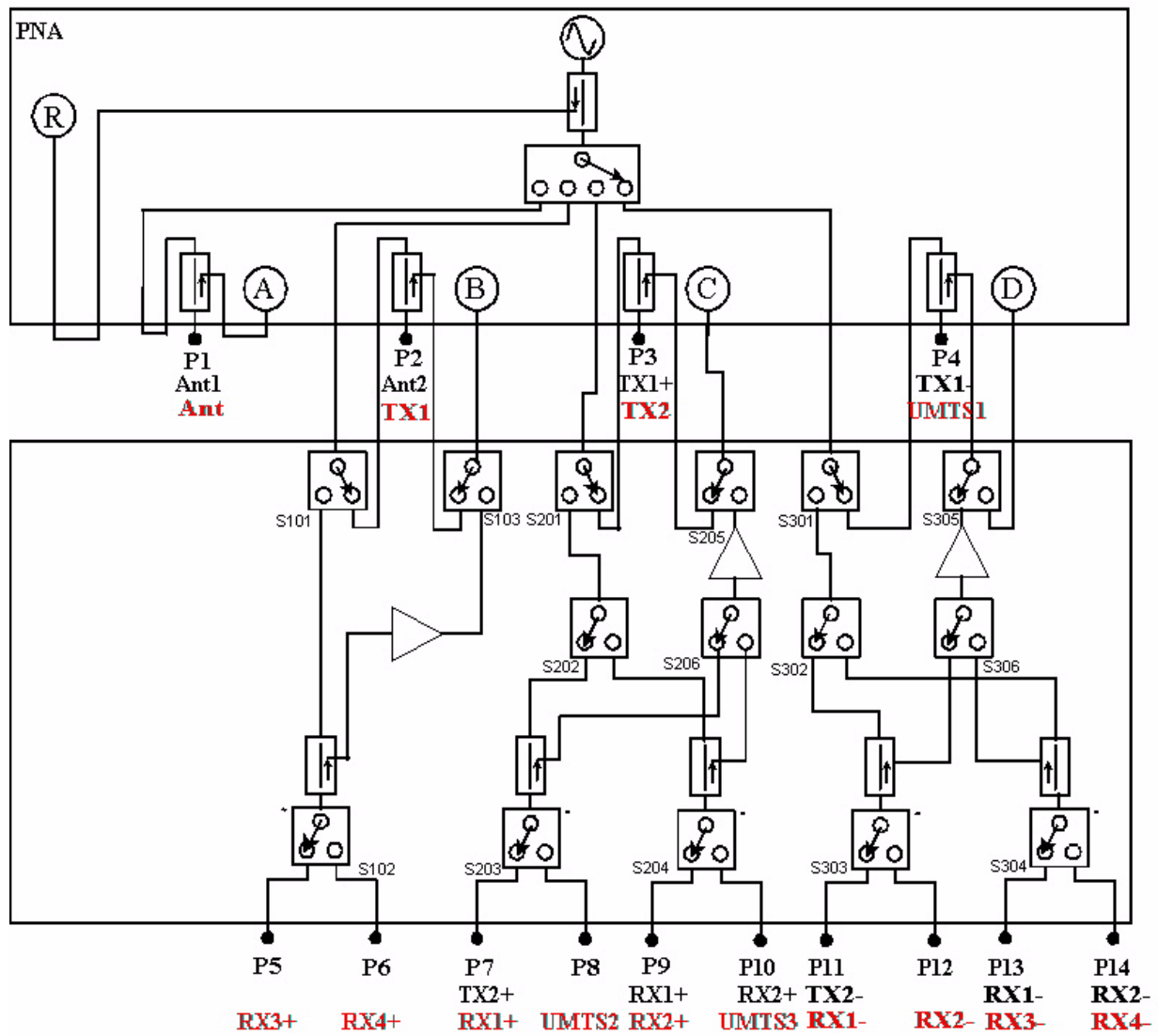
Table 16 contains the information to set the control lines of the Z5623AK66 Test Set. Refer to “DUT Control” on page 17.

NOTE All DUT control lines must be set with each command sent. Logic 0 = high

Table 16 Address and Data DUT Control Lines

Address	Data	Data AD12-AD0	Description							Bit Data 0= +Voltage 1= -Voltage
64	0	000000000000	ALL DUT Control Lines set to 0 or + voltage							
64	255	000000111111	ALL DUT Control Lines set to 0 or – voltage							
64		00000xxxxxxxB	DUT Control Line 1							0,1
64		00000xxxxxxBx	DUT Control Line 2							0,1
64		00000xxxxxxBxx	DUT Control Line 3							0,1
64		00000xxxxxxBxxx	DUT Control Line 4							0,1
64		00000xxxxxxBxxxx	DUT Control Line 5							0,1
64		00000xxBxxxxxx	DUT Control Line 6							0,1
64		00000xBxxxxxx	DUT Control Line 7							0,1
64		00000Bxxxxxx	DUT Control Line 8							0,1
Control Lines			Line 8	Line 7	Line 6	Line 5	Line 4	Line 3	Line 2	Line 1
Test Set I/O Bits			AD7	AD6	AD5	AD4	AD3	AD2	AD1	AD0
Bit Decimal Equivalent			128	64	32	16	12	4	2	1
Example 1 Data = 0			0	0	0	0	0	0	0	0
Example 2 Data = 21			0	0	0	1	0	1	0	1
X indicates unknown user bit state										
B indicates bit of interest										
There are 256 individual switch combinations for the Z5623AK66. To select a test set DUT control line configuration, all 8 DUT control lines must be set. To do this you must add AD7 to AD0 binary number and convert this to a decimal equivalent.										

Figure 13 System Level Block Diagram



Z5623AK66

14 Port Test System for WLAN and FEM

Specification

Specifications for the Z5623AK66 Multiport Test Set are nominal. System performance for the PNA and Test Set are not provided. A functional certificate is only offered for the Z5623AK66.

NOTE Nominal specifications are based on 1 to 2 unit's performance.

NOTE This Test Set, when connected to a PNA, will degrade the performance of the test ports that the Test Set interconnects to. The internal solid-state switch paths reduce Test Port power and power to the receiver ports. This affects not only the test port power of the PNA and also reduces dynamic range. Test Port power of the PNA will be reduced as much as 10 dB and power to the receivers will be reduced by as much as 10 dB. This will decrease the dynamic range by 20 dB.

Declaration of Conformity

For a copy of the manufacturer's Declaration of Conformity for this apparatus, contact your local Agilent Technologies office or sales representative on [Page 53](#).

Servicing the Z5623AK66 Multiport Test Set

Service Information

Return to Agilent Technologies factory for servicing or repair. Refer to [“Contacting Agilent” on page 53](#).

WARNING **No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.**

WARNING **These servicing instructions are for use by qualified personnel only. To avoid electrical shock, do not perform any servicing unless you are qualified to do so.**

Shipping Instructions

You must always call the Agilent Technologies Instrument Support Center to initiate service before retuning your instrument to a service office. See [“Contacting Agilent” on page 53](#). Always transport or ship the instrument using the original packaging if possible. If not, comparable packaging must be used. Attach a complete description of the failure symptoms.

Safety and Regulatory Information

Introduction

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

Before Applying Power

Verify that the product is configured to match the available main power source. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

Connector Care and Cleaning

If alcohol is used to clean the connectors, the power cord to the instrument must be removed. All cleaning should take place in a well ventilated area. Allow adequate time for the fumes to disperse and moist alcohol to evaporate prior to energizing the instrument.

WARNING **To prevent electrical shock, disconnect the Agilent Technologies model Z5623A from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.**

Compliance with Canadian EMC Requirements

This ISM device complies with Canadian ICES-001.
Cet appareil ISM est conforme a la norme NMB du Canada.

Compliance with German Noise Requirements

This is to declare that this instrument is in conformance with the German Regulation on Noise Declaration for Machines (Laermangabe nach der Maschinenlaermrrordnung-3. GSGV Deutschland).

Acoustic Noise Emission/Geraeuschemission	
LpA<70 dB	Lpa<70 dB
Operator Position	am Arbeitsplatz
Normal Operation	normaler Betrieb
per ISO 7779	nach DIN 45635 t. 19

Warnings

WARNING The **WARNING** notice denotes a hazard. It calls attention to a procedure, practice, or the like, which if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

Warnings applicable to this instrument are:

WARNING If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

WARNING For continued protection against fire hazard replace line fuse only with same type and rating:

- United States—F 5A/250V, Part Number 2110-0709
- Europe—F 5A/250V, Part Number 2110-0709

The use of other fuses or material is prohibited.

WARNING This is a Safety Class I product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall be inserted only into a socket outlet provided with a protective earth contact. Any interruption of the protective conductor, inside or outside the instrument, is likely to make the instrument dangerous. Intentional interruption is prohibited.

WARNING The power cord is connected to internal capacitors that may retain dangerous electrical charges for 5 seconds after disconnecting the plug from its power supply.

WARNING The opening of covers or removal of parts is likely to expose dangerous voltages. Disconnect the instrument from all voltage sources while it is being opened.

WARNING If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

WARNING The detachable power cord is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. The front panel switch is only a standby switch and is not a **LINE** switch (disconnecting device).

Cautions

CAUTION The CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

Caution applicable to this instrument are:













CAUTION Always use the three-prong ac power cord supplied with this instrument. Failure to ensure adequate earth grounding (by not using this cord) can cause instrument damage.

CAUTION This instrument has autoranging line voltage input; be sure the supply voltage is within the specified range.

CAUTION Ventilation Requirements: When installing the instrument in a cabinet, the convection into and out of the instrument must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the instrument by 4 °C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, forced convection must be used.

CAUTION This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 61010-1:2000, and 664 respectively.

Instrument Markings

	When you see this symbol on your instrument, you should refer to the instrument's instruction manual for important information.
	This symbol indicates hazardous voltages.
	The laser radiation symbol is marked on products that have a laser output.
	This symbol indicates that the instrument requires alternating current (ac) input.
	The CE mark is a registered trademark of the European Community. If it is accompanied by a year, it indicates the year the design was proven.
	The CSA mark is a registered trademark of the Canadian Standards Association.
	This symbol indicates the product meets the Australian Standards.
	This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).
	This text indicates that the instrument is an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).
	This symbol indicates that the power line switch is ON.
	This symbol indicates that the power line switch is OFF or in STANDBY position.
	Safety Earth Ground. This is a Safety Class I product (provided with a protective earthing terminal). An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and secured against any unintended operation.

Contacting Agilent

By internet, phone, or fax, get assistance with all your test and measurement needs.

This information supersedes all prior contact information.			
Online assistance: www.agilent.com/find/assist			
Americas			
Brazil (tel) (+55) 11 3351 7012 (fax) (+55) 11 3351 7024	Canada (tel) +1 877 894 4414 (fax) +1 303 662 3369	Mexico (tel) 1 800 254 2440 (fax) 1 800 254 4222	United States (tel) 800 829 4444 (alt) (+1) 303 662 3998 (fax) 800 829 4433
Asia Pacific and Japan			
Australia (tel) 1 800 225 574 (fax) 1 800 681 776 (fax) 1 800 225 539	China (tel) 800 810 0508 (alt) 800 810 0510 (fax) 800 810 0507 (fax) 800 810 0362	Hong Kong (tel) 800 933 229 (fax) 800 900 701	India (tel) 1600 112 626 (fax) 1600 112 727 (fax) 1600 113 040
Japan (Bench) (tel) 0120 32 0119 (alt) (+81) 426 56 7799 (fax) 0120 01 2144	Japan (On-Site) (tel) 0120 802 363 (alt) (+81) 426 56 7498 (fax) (+81) 426 60 8953	Singapore (tel) 1 800 275 0880 (fax) (+65) 6755 1235 (fax) (+65) 6755 1214	South Korea (tel) 080 778 0011 (fax) 080 778 0013
Taiwan (tel) 0800 047 669 (fax) 0800 047 667 (fax) 886 3492 0779	Thailand (tel) 1 800 2758 5822 (alt) (+66) 2267 5913 (fax) 1 800 656 336	Malaysia (tel) 1800 880 399 (fax) 1800 801 054	
Europe			
Austria (tel) 0820 87 44 11* (fax) 0820 87 44 22	Belgium (tel) (+32) (0)2 404 9340 (alt) (+32) (0)2 404 9000 (fax) (+32) (0)2 404 9395	Denmark (tel) (+45) 7013 1515 (alt) (+45) 7013 7313 (fax) (+45) 7013 1555	Finland (tel) (+358) 10 855 2100 (fax) (+358) (0) 10 855 2923
France (tel) 0825 010 700* (alt) (+33) (0)1 6453 5623 (fax) 0825 010 701*	Germany (tel) 01805 24 6333* (alt) 01805 24 6330* (fax) 01805 24 6336*	Ireland (tel) (+353) (0)1 890 924 204 (alt) (+353) (0)1 890 924 206 (fax) (+353) (0)1 890 924 024	Israel (tel) (+972) 3 9288 500 (fax) (+972) 3 9288 501
Italy (tel) (+39) (0)2 9260 8484 (fax) (+39) (0)2 9544 1175	Luxemburg (tel) (+32) (0)2 404 9340 (alt) (+32) (0)2 404 9000 (fax) (+32) (0)2 404 9395	Netherlands (tel) (+31) (0)20 547 2111 (alt) (+31) (0)20 547 2000 (fax) (+31) (0)20 547 2190	Russia (tel) (+7) 095 797 3963 (alt) (+7) 095 797 3900 (fax) (+7) 095 797 3901
Spain (tel) (+34) 91 631 3300 (alt) (+34) 91 631 3000 (fax) (+34) 91 631 3301	Sweden (tel) 0200 88 22 55* (alt) (+46) (0)8 5064 8686 (fax) 020 120 2266*	Switzerland (French) (tel) 0800 80 5353 opt. 2* (alt) (+33) (0)1 6453 5623 (fax) (+41) (0)22 567 5313	Switzerland (German) (tel) 0800 80 5353 opt. 1* (alt) (+49) (0)7031 464 6333 (fax) (+41) (0)1 272 7373
Switzerland (Italian) (tel) 0800 80 5353 opt. 3* (alt) (+39) (0)2 9260 8484 (fax) (+41) (0)22 567 5314	United Kingdom (tel) (+44) (0)7004 666666 (alt) (+44) (0)7004 123123 (fax) (+44) (0)7004 444555		
(tel) = primary telephone number; (alt) = alternate telephone number; (fax) = FAX number; * = in country number 11/16/04			

