Description

The Agilent U3042AE12 is a 12-Port solid-state extension test set with a range of 10 MHz to 26.5 GHz. The 4-Port extension test set can be connected to a 4-Port PNA, PNA-L or PNA-X Network Analyzer. This expands the 4-Port network analyzer to a 16 test port analyzer with full cross bar measurement capability. Option 551 in the Network Analyzer provides N port calibration capabilities.

The test set is directly controlled by the network analyzer, no external personal computer or software is required.

The N5222A PNA, N5230A/C and N5232A PNA-L and N5242A PNA-X Network Analyzer's will be referred to as the PNA, PNA-L and PNA-X throughout this document. Analyzer refers to all series of PNA, PNA-L and PNA-X. The U3042AE12 will be referred to as the test set.

Network Analyzer Requirements

- For Multiport Operations the Network Analyzer requires Option 551 (N-Port error correction and measurement capability).
- The N5222A PNA requires Option 401, 417 or 419 (4-Port) with a configurable test set option to provide the test set interface connections. Install test set file u304xae12_pnax_p4.tsx for multiport operation.
- The N5230A/C PNA-L requires Option 245, 145, 246 or 146 (4-Port) with a configurable test set option to provide the test set interface connections. Install test set file u3042ae12_p4.tsx for multiport operation.
- The N5232A PNA -L requires Option 416 (4-Port) with a configurable test set option to provide the test set interface connections. Install test set file u3042ae12_p4.tsx for multiport operation.
- The N5242A PNA-X requires Option 400 to provide the test set interface connections and requires test set file u304xae12_pnax_p4.tsx.

The following test set file must be installed into the network analyzer file directory:
c:\Program Files\Agilent\Network Analyzer\testsets

More PNA information is available on the following websites:

- Documentation - *http://www.agilent.com/find/pna*
- Network Analyzer Firmware - *http://na.tm.agilent.com/pna/firmware/firmware.htm*
- U3042AE12 Test Set Files - *http://na.tm.agilent.com/multiport* (see test set files)

Available Options

Test Set Options

The test set has three available options:
Refer to "System Block Diagrams" beginning on page 59.

- Standard - Solid-state switches for fast switch speed and improved switch life. No Option 001 or 002 on the serial tag.
- Option 001 - Solid-state switches with amplifiers to improve dynamic range.
- Option 002 - Solid-state switches with amplifiers and bias-tees for each port.

NOTE The Options 700, 001, and 002 limit the frequency range due to blocking capacitors in the switches and amplifier performance. Solid-state switches degrade frequencies below 2 MHz, and 001 or 002 amplifiers degrade performance above 18 GHz.

Accessory Options

Installation instructions are included in the option package.

- U3042A-1CM - Rackmount Kit (5063-9215)
- U3042A-1CN - Front Handle Kit (5063-9228)
- U3042A-1CP - Rackmount with Front Handle Kit (5063-9222)

Cable Kit Options

The U3042AE12 available cable options:

- U3021PL3 Option 430 provides the interface cable set and hardware to connect the test set to the PNA-L. Includes kits U3021-60001 and U3021-60045.
- U3021PL3 Option 442 provides the interface cable set and hardware to connect the test set to the PNA-X. Includes kits U3021-60002 and U3021-60047.

Verifying the Shipment

To verify the contents shipped with your product, refer to the "Box Content List" included with the shipment.

Inspect the shipping container. If the container or packing material is damaged, it should be kept until the contents of the shipment have been checked mechanically and electrically. If there is physical damage refer to "Contacting Agilent" on page 82. Keep the damaged shipping materials (if any) for inspection by the carrier and an Agilent Technologies representative.

General Specifications

Specifications for the test set are characteristic for the system performance of the network analyzer and test set. Actual performance of the system is based on the customer's network analyzer and options that are used with the test set. A functional certificate is only offered for the test set.

An N-Port calibration should be performed for optimum measurement accuracy.

A periodic calibration is not required. The Operators Check should be performed after System Setup, or if performance is in question.

When connected to a analyzer, the test set will degrade the performance at the test ports. The internal switch paths reduce test port power to the receivers. This affects the test port power of the analyzer and also reduces dynamic range. The reflection tracking values measured in the "Cal Kit Operational Check" on page 48 can be subtracted from the analyzers dynamic range to determine the approximate performance of the system.

Power Requirements

Verify that the required ac power is available before installing the test set to the PNA.

- 100/120/220/240 VAC (50/60Hz)
- The instruments can operate with mains supply voltage fluctuations up to ± 10% of the nominal voltage.
- Air conditioning equipment (or other motor–operated equipment) should not be placed on the same ac line that powers the test set and PNA.
- U3042AE12 maximum power is 350 W.

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.**

Environmental Requirements

Refer to your network analyzer's standard documentation for environmental requirements.

The test set complies with all applicable safety and regulatory requirements for the intended location of use.

- Pressure Altitude (Operation)
  3,000 meters (~10,000 feet)
- The instrument can safely operate in a relative humidity of 80% for temperatures to 31 degrees C, decreasing linearly to 50% relative humidity at 40 degrees C.

Equipment Heating and Cooling

If necessary, install air conditioning and heating to maintain the ambient temperature within the appropriate 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.

Required Conditions for Accuracy Enhanced Measurement

Accuracy–enhanced (error–corrected) measurements require the ambient temperature of the analyzer and test set to be maintained within ± 1 °C of the ambient temperature at calibration.

Dimensions and Space Requirements

Standard installation of the test set and analyzer includes configuration and installation on a customer provided lab bench or table top of adequate size and strength. For weight, dimensions and space requirements, refer to the network analyzer documentation that is used to configure the test set.

CAUTION The network analyzer is heavy. It is recommended that two individuals, or a mechanical lift be used to lift or transport the instrument

Table 1 Instrument Dimensions

Model	Weight	Height	Width	Depth
U3042AE12	11.4 kg (25 lb)	19.1 cm (7.5 in)	42.5 cm (16.7 in)	43.2 cm (17 in)

Power Levels

CAUTION It is recommended that you do not operate components near damage levels (+30 dBm). The power levels must be 3 dB below maximum level to ensure no damage.

Table 2 Recommended Power Levels

U3042AE12 Test Port RF Power Levels:	
PORT 5-16	+27 dBm 0 Vdc
U3042AE12 Access Ports:	
SOURCE OUT	+20 dBm 0 Vdc
CPLR ARM	+20 dbm 0 Vdc
CPLR THRU	+20 dBm 0 Vdc
RCVR OUT	+20 dBm 0 Vdc

NOTE Refer to your analyzer's specifications to determine the maximum input power levels for the analyzer's access and test ports, or to optimize the power levels in the receivers.

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

Typical Reflection Tracking

Specifications for the test set are typical. System performance for the analyzer and test set are only characteristic and are intended as non-warranted information.

NOTE Typical specifications are based on 1 to 2 units performance. Refer to Table 3 and Table 4.

Table 3 Typical Reflection Tracking PNA-L

Frequency	Standard 700	Option 001	Option 002
300 kHz to 10 MHz[1]	–80	–100	–100
10 MHz to 4 GHz	–10	+2	+1
4 GHz to 6 GHz	–12	+1	+0
6 GHz to 10.5 GHz	–13	–2	–3
10.5 GHz to 13.5 GHz	–14	–3	–4
13.5 GHz to 15 GHz	–15	–3	–4
15 GHz to 20 GHz	–20	–13	–15

1. Generally improves at 3 MHz to –6 dBm.

Table 4 Typical Reflection Tracking PNA and PNA-X

Frequency	Standard 700	Option 001	Option 002
10 MHz to 50 MHz	–3	+5	+4
50 MHz to 500 MHz	–5	+5	+4
500 MHz to 3.2 GHz	–10	+2	+1
3.2 GHz to 10 GHz	–12	–2	–3
10 GHz to 16 GHz	–17	–4	–5
16 GHz to 20 GHz	–20	–13	–15
20 GHz to 24 GHz	–22	–21	–23
24 GHz to 26.5 GHz	–25	–35	–37