Agilent N4972A

Clock Synthesizer 16 GHz

Getting Started Guide

Agilent Technologies

Notices

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For Assistance and Support

http://www.agilent.com/find/assist

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, 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.

WARNING

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

NOTE

A **NOTE** provides important or special information.

Safety Summary

General Safety Precautions

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

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

Before operation, review the instrument and manual for safety markings and instructions. You must follow these to ensure safe operation and to maintain the instrument in safe condition.

Initial Inspection

Inspect the shipping container for damage. If there is damage to the container or cushioning, keep them until you have checked the contents of the shipment for completeness and verified the instrument both mechanically and electrically. The Performance Tests give procedures for checking the operation of the instrument. If the contents are incomplete, mechanical damage or defect is apparent, or if an instrument does not pass the operator's checks, notify the nearest Agilent Technologies Sales/Service Office.

WARNING To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any portion of the outer enclosure (covers, panels, etc.).

General

This product is a Safety Class 1 product (provided with a protective earthing ground incorporated in the power cord). The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. Any interruption of the protective conductor, inside or outside of the instrument, will make the instrument dangerous. Intentional interruption is prohibited.

Environment Conditions

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment per IEC 61010 Second Edition and 664 respectively. It is designed to operate within a temperature range of 10 to 40 °C at a maximum relative humidity of 80% for temperatures up to 31 °C, decreasing linearly to 50% relative humidity at 40 °C at an altitude of 2000 meters.

This module can be stored or shipped at temperatures between -40°C and +70°C. Protect the module from temperature extremes that may cause condensation within it.

Before Applying Power

Verify that all safety precautions are taken. The power cable inlet of the instrument serves as a device to disconnect from the mains in case of hazard. The instrument must be positioned so that the operator can easily access the power cable inlet. When the instrument is rack mounted the rack must be provided with an easily accessible mains switch.

Ground the Instrument

Install the instrument so that the ON / OFF switch is readily identifiable and is easily reached by the operator. The ON / OFF switch is the instrument disconnecting device. It disconnects the mains circuits from the mains supply before other parts of the instrument. Or the detachable power cord can be removed from the electrical supply. Alternately, an externally installed switch or circuit breaker which is readily identifiable and is easily reached by the operator may be used as a disconnecting device.

Do Not Operate in an Explosive Atmosphere

Do not operate the instrument in the presence of flammable gases or fumes.

Do Not Remove the Instrument Cover

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made only by qualified personnel.

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

Symbols on Instruments

Indicates warning or caution. If you see this symbol on a product, you must refer to the manuals for specific Warning or Caution information to avoid personal injury or damage to the product.

C-Tick Conformity Mark of the Australian ACA for EMC compliance.

The CSA mark is a registered trademark of the CSA International. This instrument complies with Canada: CSA 22.2 No. 61010-1 -04.

Indicates that protective earthing ground is incorporated in the power cord.

This symbol indicates that internal circuits can be damaged by electrostatic discharge (ESD), therefore, avoid applying static discharges to the panel input connectors.

ICES/NMB-001

This mark indicates compliance with the Canadian EMC regulations.

ISM 1-A

This text denotes the instrument is an Industrial Scientific and Medical Group 1 Class A product.

CE Marking to state compliance within the European Community: This product is in conformity with the relevant European Directives: EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC.

China RoHS regulations include requirements related to packaging, and require compliance to China standard GB18455-2001. This symbol indicates compliance with the China RoHS regulations for paper/fiberboard packaging.

Indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Twenty five years is the expected useful life of the product.

The Korean Certification (KC) mark is required for products that are subject to legally compulsory certification.

The KC mark includes the marking's identifier code that has up to 26 digits and follows this format: KCC-VWX-YYY-ZZZZZZZZZZZZZ.

~

This symbol indicates that the instrument requires alternating current (AC) input.

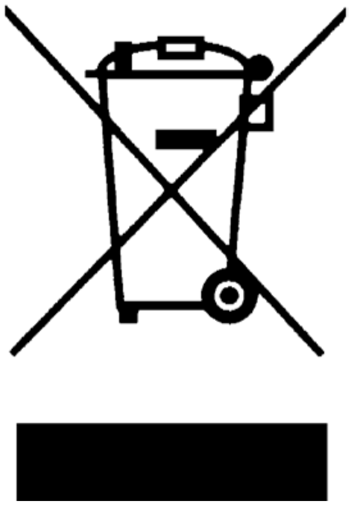
|

This symbol indicates that the power line switch is in the ON position.

O

This symbol indicates that the power line switch is in the OFF position.

Environmental Information



This product complies with the WEEE Directive (2002/96/EC) marketing requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste.

Product category: With reference to the equipment types in the WEEE Directive Annexure I, this product is classed as a "Monitoring and Control instrumentation" product.

Do not dispose in domestic household waste.

To return unwanted products, contact your local Agilent office, or see

www.agilent.com/environment/product/ for more information.

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1 Getting Started

1.1 Introduction

Welcome to the Agilent Technologies N4972A clock synthesizer 16 GHz getting started guide. This guide will help you identify the contents of the shipping package, perform a quick functional check of the product, and guide you on where to find more information and support for the N4972A.

The N4972A is shipped in a protective box with all the accessories required for operation. The shipping box contains:

- N4972A-CJ0 or N4972A-CJ1 (SCS16000 or SCS16000J) clock synthesizer 16 GHz

Figure 1. N4972A-CJ0 or N4972A-CJ1 (SCS16000 or SCS16000J) clock synthesizer 16 GHz

- AC power cord
- SMA male to SMA male cable (2)
    - Connect one cable from the Jitter output of the N4972A to the pattern generator clock input (or Ref CLK input of N4965A-CTR (PCB12500))
    - Connect the other cable from the N4972A Delay output to the error detector clock input (or the Aux Clock input of the N4965A-CTR (PCB12500))
- CD-ROM, which includes:
    - N4972A data sheet
    - N4972A getting started guide
    - N4972A user guide

1.2 Support

For more information on the operation and features of the N4972A please refer to the N4972A user guide on the CD or the product webpage http://www.agilent.com/find/N4972A.

Technical Support information: http://www.agilent.com/find/assist.

1.3 General Specifications

Before installing the N4972A, review the specifications in Table 1.

Table 1. Specification considerations before installation

Parameter	Specification
Connector type All signals except 10 MHz Ref In/Out – 10 MHz Ref In/Out –	 SMA BNC
Remote control interface	USB2.0 and IEEE-488 (GPIB)

Parameter	Specification
Operating temperature	+10°C to +40°C
Storage temperature	-40°C to +70°C
Voltage	100 to 240 VAC ±10% autoranging
Frequency	50/ 60 Hz
Power	145 Watts MAX
Current	1.8A RMS MAX
Fuse	250 V 2A 5x20 mm (p/n 12260-002) Always replace instrument fuse with one of the same type and rating.
EMC	Complies with European EMC Directive 2004/108/EC IEC/EN 61326-1 CISPR Pub 11 Group 1, class A AS/NZS CISPR 11 ICES/NMB-001 This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.
Safety	Complies with European Low Voltage Directive 2006/95/EC IEC/EN 61010-1, 2nd Edition Canada: CSA C22.2 No. 61010-1 USA: UL std no. 61010-1, 2nd Edition Acoustic noise emission Geraeuschemission LpA <70 dB LpA <70 dB Operator position Am Arbeitsplatz Normal position Normaler Betrieb Per ISO 7779 Nach DIN 45635 t.19
Weight	7.0 lb
Height	3.9 in
Width	16.7 in
Depth	16.7 in

1.4 Safety and Regulatory

This product has been designed and tested in accordance with accepted industry standards, 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.

WARNING **Do not remove instrument covers. There are no user serviceable parts within. Operation of the instrument in a manner not specified by Agilent Technologies may result in personal injury or loss of life.**

WARNING **For continued protection against fire hazard, replace fuses, and or circuit breakers only with same type and ratings. The use of other fuses, circuit breakers or materials is prohibited.**

WARNING **To prevent electrical shock, disconnect instrument 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.**

CAUTION The Mains wiring and connectors shall be compatible with the connector used in the premise electrical system. Failure, to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

CAUTION Before switching on this instrument, make sure the supply voltage is in the specified range.

1.5 Unpacking

Carefully remove the instrument from the case in an ESD-safe environment.

1.6 Important Notes

- Use ESD protection at all times when using the instrument
- Use the 2.92 mm adapters on 2.92 mm ports
- Install the instrument on a flat surface away from heat sources
- Do not block the fans, or the exhaust vents on the rear and side panels (3" min. clearance).
- Use a 8 lbf-in (90 N-cm) torque wrench when attaching connectors

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1.7 Installation

1. Plug the AC power cord into the N4972A-CJ0 or N4972A-CJ1 rear panel power socket.
2. Plug the other end of the AC power cord into a suitable wall socket. (100 to 240 VAC, 50/60 Hz).
3. If the N4972A is being used as a clock source for a N4965A-CTR (PCB12500) multi-channel BERT or N4971A (PPG12500) pattern generator, use the included SMA cable to connect the jitter clock output on the N4972A to the Clock In on the N4965A-CTR or N4971A.
4. If the N4972A is being used as a clock source for the N4962A (TG1B1-A) serial BERT, two clock connectors are needed. Connect the N4972A Jitter Clock output on the N4962A (TG1B1-A) TX CKI on the rear panel. Connect the N4972A Delayed Clock output to the N4962A RX CKI on the rear panel.

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 protections are intact) only.**

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

5. Turn the power switch to ON. After several seconds the instrument will complete its power on sequence and be ready to operate.
6. From the power on state, perform the following steps:
    a. Press the soft key representing the down arrow ▼ to position the cursor on the Jit Clk Out Menu.
    b. Press Sel (bottom soft key).
    c. Press the up arrow ▲ soft key to select OutEnable.

   d. Press Edit (bottom soft key) to enable changing the argument.
   e. Toggle the argument OFF to ON by either slightly turning the knob or pressing either decrement ◄ or increment ► hard keys on the numeric pad.
   f. Enter the argument by pressing Exit (bottom soft key). This enables the main (jittered) clock output at the nominal default power on settings.

7. If the N4972A is being used to clock a N4962A, then the second output must also be enabled to clock the error detector:
   a. Return to the main menu by pressing Back (top soft key).
   b. Press the down arrow ▼soft key as needed to position the cursor on the Dly Clk Out Menu.
   c. Select the menu by pressing Sel (bottom soft key).
   d. Press the up arrow ▲ soft key to select OutEnable.
   e. Press Edit (bottom soft key) to enable changing the argument.
   f. Toggle the argument OFF to ON by either slightly turning the knob or pressing either decrement ◄ or increment ► hard keys on the numeric pad.
   g. Enter the argument by pressing Exit (bottom soft key). This enables the delayed clock output at the nominal default power on settings.

The N4965A-CTR or N4971A should now be clocked at the power one default settings of the N4972A.

1.8 Connector Care

The N4972A clock synthesizer 16 GHz features high-quality SMA and 2.92 mm connectors for the front and rear panel input and output connections. Connector damage will degrade signal fidelity.

Use 2.92 mm adapters on 2.92 mm clock and data ports and high quality SMA-connectors on the SMA ports. Always leave dust jackets on unused ports.

CAUTION Excessive mating of low quality SMA components to 2.92 mm female receptacles may degrade the 2.92 mm female receptacle.

Inspect the connectors for the following:

- Worn or damaged threads
- Scratches to mating surface
- Burrs and loose metal particles
- Ensure that female contacts are straight and aligned

Clean the connectors as described in the following procedure. Cleaning connectors with alcohol shall only be done with the instruments power cord removed, and in a well-ventilated area. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.

1. Remove any loose particles using a low-pressure air source.
2. Moisten a lint-free swab with isopropyl alcohol. Do not saturate the swab.
3. Minimize the wicking of the alcohol into the connector structure.
4. Clean the mating plane surfaces and threads.
5. Allow alcohol to evaporate, and then use a low-pressure air source to blow surfaces clean.
6. Make sure no particles or residue remains.
7. Inspect connector for damage.

1.9 Returning the N4972A to Agilent Technologies

If the N4972A fails system verification and you cannot correct the problem, return N4972A to Agilent Technologies for repair following the steps shown below.

1. Record all symptoms.
2. Contact Agilent Technologies using the "Request an RMA" form at http://www.agilent.com/find/assist.
3. Use the original packing material or comparable packing material to ship the instrument to Agilent Technologies.

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