



PRECISION CONTROL

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MEASURING SHORT TERM MICRO-JUMPS

The PC400 Phase Noise Test Rack and a Time Interval Analyzer can be configured to measure short term micro-jumps. The output signal from the oscillator or crystal under test is measured by the analyzer and the jitter distribution plot is generated by the analyzer's internal software.



Note: Only the PC400 Phase Noise Test Rack, Standard Oscillator Module, Unit Under Test Module are shown. The computer, mixer, low pass filter, time interval analyzer, frequency counter, printer, and power supplies are not shown. See Equipment List below for details to complete the short term micro-jump system.

FEATURES

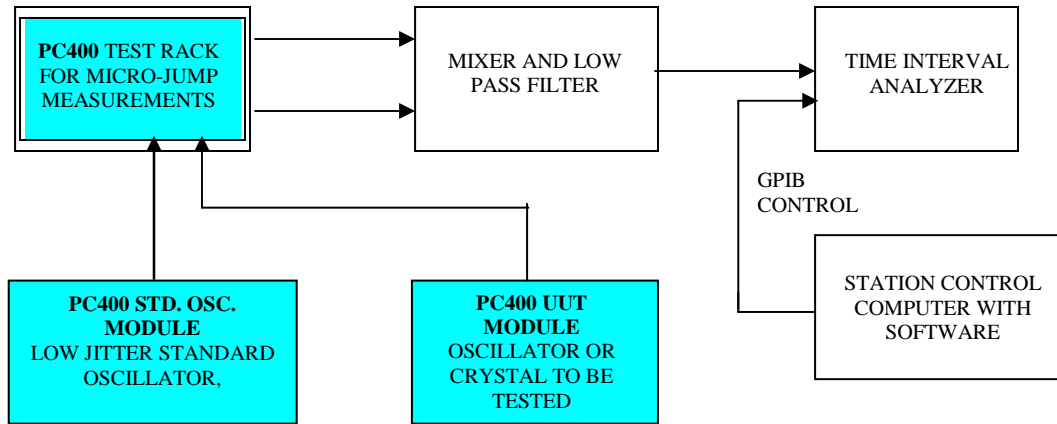
- * Measurement of Crystal, XO, TCXO, VCXO, and OCXO short term micro-jumps
- * Self-contained PC400 test rack and modules for set-up and measurement of short term micro-jumps using the time interval analyzer
- * System can be used to screen crystals for short term micro-jumps
- * Full manual use of the time interval analyzer, power supplies, and frequency counter

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MICRO-JUMP TEST STATION BLOCK DIAGRAM



SHORT TERM MICRO-JUMP TEST STATION CAPABILITIES USING PRECISION CONTROL PC400 & RACAL MODEL 2351 TIA

FREQUENCY RANGE:	4 MHz to 880 MHz with supplied standards,
ACCEPTABLE OUTPUT OF OSCILLATORS UNDER TEST:	TTL, CMOS, LVDS, PECL, Sinewave with +5 dBm minimum output
ACCEPTABLE CRYSTALS UNDER TEST:	Fundamental Crystals, +/-150 ppm; 3 rd Overtone Crystals, +/-50 ppm; 5 th Overtone Crystals, +/-20 ppm
ACCURACY OF UNIT UNDER TEST:	Supplied Low Jitter Standard Oscillator with purchaser supplied fundamental Crystals, +/-150 ppm; 3 rd Overtone Crystals, +/-50 ppm; 5 th Overtone Crystals, +/-20 ppm



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STD. PACKAGE CONFIGURATIONS
OF OSCILLATOR UNDER TEST:

ZIP socket for Full, Half Size DIP oscillator. Optional adapters are available for a variety of SMD packages. Purchaser supplied SMD adapters can be inserted in the 14 Pin ZIP socket.

STD. PACKAGE CONFIGURATIONS
OF CRYSTAL UNDER TEST:

All packages with lead dimension of 0.02" +/-005". Optional adapters are available for a variety of SMD packages. Purchaser supplied or optional SMD adapters can be inserted in the crystal sockets.

MAXIMUM DATA POINTS:

8000

MEASUREMENT GATE TIME:

1 Millisecond to 1000 Seconds

RESOLUTION OF MICRO-JUMPS:

1×10^{-11} to 1×10^{-9} depending of standard VCXO frequency offset, time interval measured, gate time, and oscillator or crystal frequency measured.

INPUT POWER:

120 V.A.C., 50 to 60 Hz (International voltages are available), an earth grounded single 15 amp single service is recommended.

PC400 TEST RACK SIZE:

5.25" High x 17.5" Wide x 20.0" Deep (including connectors and covers). The power supplies and frequency counter sits on top of the PC400 Test Rack and adds an additional 7.5" to the height for a total height of 12.75".

TWO PC400 MODULE SIZES:

3.5" High x 7.5" Wide x 5" Deep (including connectors and covers).



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RECOMMENDED BENCH AREA:

8' Long x 3' Deep for the PC400, Standard Oscillator Module, UUT Module, associated set-up test equipment, time interval analyzer, computer, printer, and work space

PC400 STANDARD OSCILLATOR AND CRYSTAL SCREENING OSCILLATOR:

The testing of micro-jumps requires two oscillators; one is the screening oscillator to screen purchaser supplied crystals for micro-jumps and also used to measure the crystal under test (eleven oscillators are supplied to cover the frequency range). The other oscillator is one of eleven supplied voltage tunable standard oscillators (VCXO) that are characterized for low noise. Each standard VCXO must contain a purchaser supplied screened crystal of the same frequency as the unit under test for frequencies 220 MHz and below, and one fourth the frequency for extended range frequencies from 220 MHz to 880 MHz. The supplied VCXO's micro-jump performance must lower than the device under test. The supplied standard VCXO plugs into the PC400 Standard Oscillator Module.

Crystals must be purchaser supplied for each specific frequency of the oscillator under test. These crystals are plugged into the supplied standard VCXO. The crystal mode (fundamental, 3rd, or 5th overtone) must be equal to or higher than the crystal used in the oscillator under test or the crystal under test. For frequencies 220 MHz and below the crystal frequency is equal to the oscillator under crystal or the crystal under test. For extended range frequencies from 220 MHz to 880 MHz, the crystal is one fourth the frequency of the oscillator under test crystal frequency or the crystal under test frequency. The accuracy of the oscillator or crystal under test must be tighter for higher overtone crystals. When crystals are ordered for each frequency tested, it is recommended that at least 3 crystals be ordered (5 recommended). The best two crystals must be selected using the supplied crystal screening oscillator and the supplied standard oscillator.

When the two lowest micro-jump crystals are found, one crystal is placed in the standard oscillator (VCXO) for use when measuring micro-jumps of the device under test. The other crystal is not used and screening oscillator is not used when making micro-jump measurements of oscillators under test.



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STANDARD OSC. PN	SCREENING OSC. PN	OSCILLATOR FREQUENCY RANGE (MHz)	USEABLE CRYSTAL MODES	EXTENDED FREQUENCY RANGE (MHz)
PC400-A1	PC400-B1	4.0 to 5.6	Fund	
PC400-A2	PC400-B2	>5.6 to 8.0	Fund	
PC400-A3	PC400-B3	>8.0 to 12.0	Fund	
PC400-A4	PC400-B4	>12.0 to 18.0	Fund	
PC400-A5	PC400-B5	>18.0 to 26.0	Fund	
PC400-A6	PC400-B6	>26.0 to 38.4	Fund, 3 rd	
PC400-A7	PC400-B7	>38.4 to 56.0	Fund, 3 rd	>220.0 to 224.0 MHz
PC400-A8	PC400-B8	>56.0 to 80.0	Fund, 3 rd	>224.0 to 320.0 MHz
PC400-A9	PC400-B9	>80.0 to 120.0	Fund, 3 rd , 5 th	>320.0 to 480.0 MHz
PC400-A10	PC400-B10	>120.0 to 180.0	Fund, 3 rd , 5 th	>480.0 to 720.0 MHz
PC400-A11	PC400-B11	>180.0 to 220.0	Fund, 3 rd , 5 th	>720.0 to 880.0 MHz

Two covers are provided and may be used to cover the low noise standard VCXO and/or screening/crystal testing oscillator or the oscillator under test. These covers are recommended for the micro-jump measurements. They also can be used to reduce radiated spurious signals from outside sources. If these covers are used, the maximum size of the oscillator under test is 3.25" x 3.25" x 1.25" (L x W x H). Optional motherboards can be provided for non-standard sizes. A stand-alone under test oscillator of any size can be used and wired into the PC400 ZIP socket.

PC400 STANDARD OSCILLATOR AND SCREENING OSCILLATOR CRYSTALS:

The user must order crystals to plug into the standard oscillator and the screening oscillator. A crystal specification is provided. Using the PC400, the micro-jump test equipment, and with the supplied standard VXCO and screening oscillator, the operator selects the best crystal to be used in the standard VXCO oscillator. **A screened crystal of the same frequency must be used in the supplied standard oscillator for each specific frequency of the oscillator or crystal under test for frequencies 220 MHz and below, and one fourth the frequency for frequencies from 220 MHz to 880 MHz.**

PURCHASER SUPPLIED OR PURCHASED STANDARD OSCILLATOR:

Using the optional adapter, the supplied standard oscillator can be substituted by a purchaser supplied or purchased VCXO. When this is done, crystals do not need to be purchased for each new frequency. **Note, the frequency of the substituted standard and screening oscillators must be the same as the frequency of the oscillator crystal or crystal under test. The micro-jumps of the VCXO must be better than the best oscillator or crystal under test.** Using the PC400 and the micro-jump test equipment, the best VCXO is selected and used as the standard oscillator to test the micro-jumps of the device under test.



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Equipment supplied or required

PC400 EQUIPMENT SUPPLIED

Qty	Description
1	PC400 Phase Noise Test Rack
1	PC400 Unit under Test (UUT) Module
1	PC400 Unit Low Noise Standard Module
1	PC400 Micro Jump Test Set
1	PC400 Accessory Kit Includes:
11	PC400 Standard Oscillator
11	PC400 Screening Oscillator
1	PC400 Full and Half Size DIP Oscillator Adapter
20	PC400 Band Pass Filters
54	Variable Coils
2	X2 Multipliers for extended frequency range
1	PC400 Cable Set
1	PC400 Manual Set

ADDITIONAL COMPONENTS AND EQUIPMENT REQUIRED BUT NOT SUPPLIED

Qty	Description
3 TO 5	*Crystals for the supplied PC400 standard and screening oscillators for each specific frequency of the unit under test for frequencies 220 MHz and below and one fourth the frequency for frequencies from 220 MHz to 880 MHz
1	**Computer/Monitor with communication boards
1	**Racal Instruments Model 2351 Time Interval Analyzer
2	**Agilent Technologies E3610A Power Supply
1	**Agilent Technologies 53131A 225 MHz Frequency Counter
1	**Double balanced high level mixer
1 to 10	**Low pass filter
1	** Color Printer

*** Quoted separately from Precision Control or purchaser supplied**

**** Purchased from manufacturer for complete short term micro-jump system**



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Optional Equipment Available

PC400 Full and Half Size DIP Oscillator Adapter with band pass filters to be used with a purchased or supplied VCXO as the Standard Oscillator.

PC400 adapters for a surface mounted oscillators to be used as the standard VCXO, screening oscillator, or for the oscillator under test.

PC400 adapters for a surface mounted crystals.

PC400 motherboards for custom or purchased standard and screening oscillators.

PC400 motherboards for odd size units to be tested for micro-jumps.