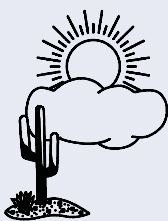


Model 2400G Oscillator Output Waveform versus Temperature Test System

*Measurements of OCXOs, TCXOs, VCXOs, DIP/DIL
Clock oscillators and SMT oscillators.*

Designed for Incoming Inspection and Final Testing Applications

The system features measurement bandwidth of over 2GHz. The system can measure TTL, HCMOS, ECL, PECL, LVDS, 5.0V, 3.3V, 2.5V and 1.8V logic and sine wave output devices. The system measures Frequency, Logic Levels, Rise Time, Fall Time, Duty Cycle, Supply current, Start Time, Pull Ability, VCXO linearity and many other parameters. The **Model 2400G** uses a high current GPIB controlled power supply to permit continuously powering all devices under test. A DVM is used to measure individual Device Under Test (DUT) currents.



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System Description System Features

The PRA Model 2400 System measurement data files can be loaded directly into MicroSoft EXCEL for customized printouts, statistical analysis, graphical data presentations, etc. PRA's optional data reduction software automatically prints many of the typically requested outputs. PRA data can be formatted to be imported by other types of spreadsheet programs, also.

Data base reduction can be done on any PC. The data is easily transferred by "memory stick" or LAN from the measurement system.

The system [high resolution DC power supply](#) to be used in special function testing.

There are three standard VCXO test parameters incorporated into the system. 1) There is a deviation limit in ppm from a nominal voltage input to pin 1. 2) Allows the user to input any number of voltage values and a deviation limit in ppm/volt for each increment (essentially specifies linearity). The limits have maximum and minimum values. 3) The user defines test voltages, the system measure the deviation at each voltage, computes the best straight line through the measured points and computes the worst case error in % from the straight line. The limit is specified as the maximum % error.

The Pin #1 or control pin testing can also include Enable/Disable and tri-state function testing.

The [test heads have the load circuit](#) for each type of oscillator (HCMOS/TTL/ECL/etc.) mounted inside the chamber on the head.

The [systems measurement sequence](#) is defined by a test procedure file. The test procedure file is written by the system user with an inter-

active menu driven program. The list of options available at each step are displayed and the system operator will choose the desired operation. These procedures are stored on the system disk drive.

To [begin measurements of the oscillators](#), the operator must select the desired test procedure file. The system then asks how many parts to test and all testing proceeds automatically.

When the [system is testing](#), the CRT on the PC displays complete system status. Also, the most current group of measurements are being scrolled on the center portion of the screen.

Any [test may be aborted](#) or halted at any time. A halted or aborted test can have the data printed up to the point of the abort.

A [list of failed oscillators](#) is printed at the conclusion of testing. The system's programs permit listing and plotting of many of the measured parameters.



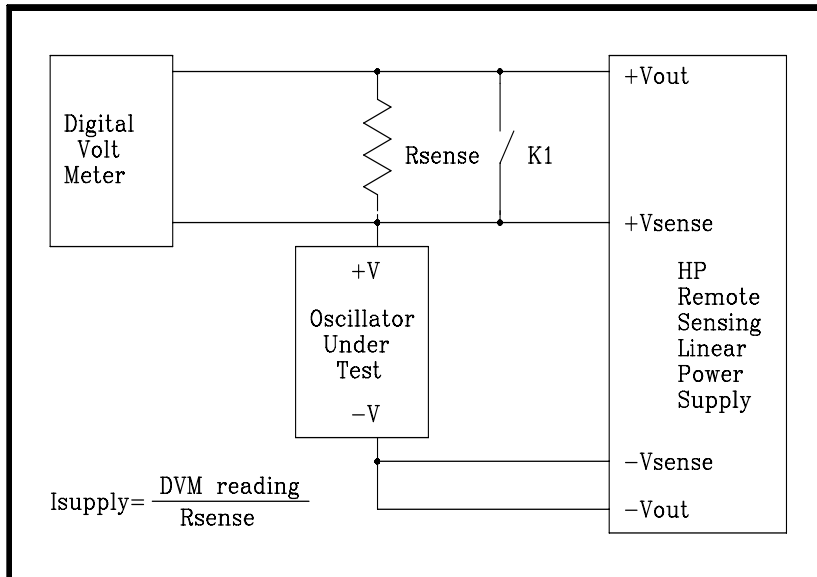
Measurement Capabilities

2400G System - The system power supply (Agilent Programmable Power Supply) and PRA Model 131B Relay Controller distributes the oscillator power, measures the oscillator supply current and provides any control voltages with a BK Precision low noise digitally programmed supply.

The oscillator supply current is measured by placing a current sensing resistor in series with the oscillator under

test and reading the voltage across the known resistor.

The Agilent Programmable Power Supplies are specified to permit up to 2 volts between the sense lead the supply output lead. The system takes advantage of this by placing the oscillator supply sensing resistor in series with the power supply output and connecting the sense lead to the oscillator. A DVM is placed across the sense resistor, the



Agilent Programmable Supply keeps the oscillator at the programmed voltage and the DVM reading divided by the sense resistor value gives the oscillator supply current.

The Agilent Programmable Power Supply is specified to keep the output voltage within 2% of the set output voltage if the sense lead should become open. To further stabilize the power supply, the relay K1 is closed when switching between oscillators under test

The system measures the frequency, the waveform and the DUT supply current in parallel. There only about 10% more measurement time to perform all measurements

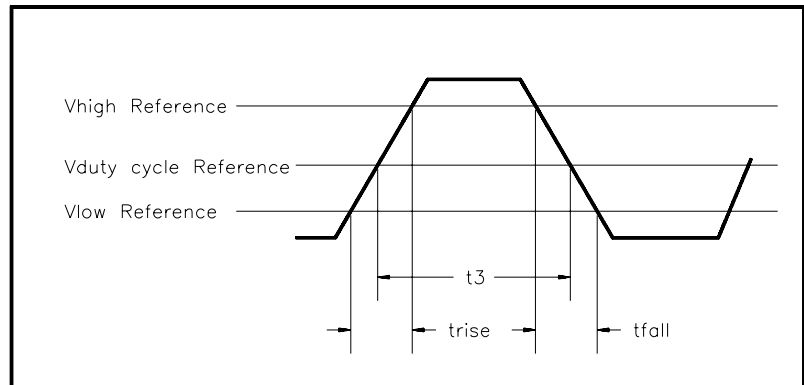
versus just frequency only. The recommended Agilent-Acqiris digital scope card is exceptionally fast.

The oscilloscope is used to digitize the waveform, all computations are done in the system controller. This greatly improves the speed of measurement and increases the flexibility of the measurement specifications.

The threshold points can be specified as % of the waveform amplitude (i.e. 20% and 80%) and the measured high and low level are used as the waveform amplitude.

Fixed voltages (i.e. 0.4V, 1.4V and 2.4V for TTL) can be used for the thresholds, % of the output amplitude can be used or a mixture of both on can be used.

The logic level measurements are an average of 5 digitized points at a user specified point on the waveform.



Data Printout

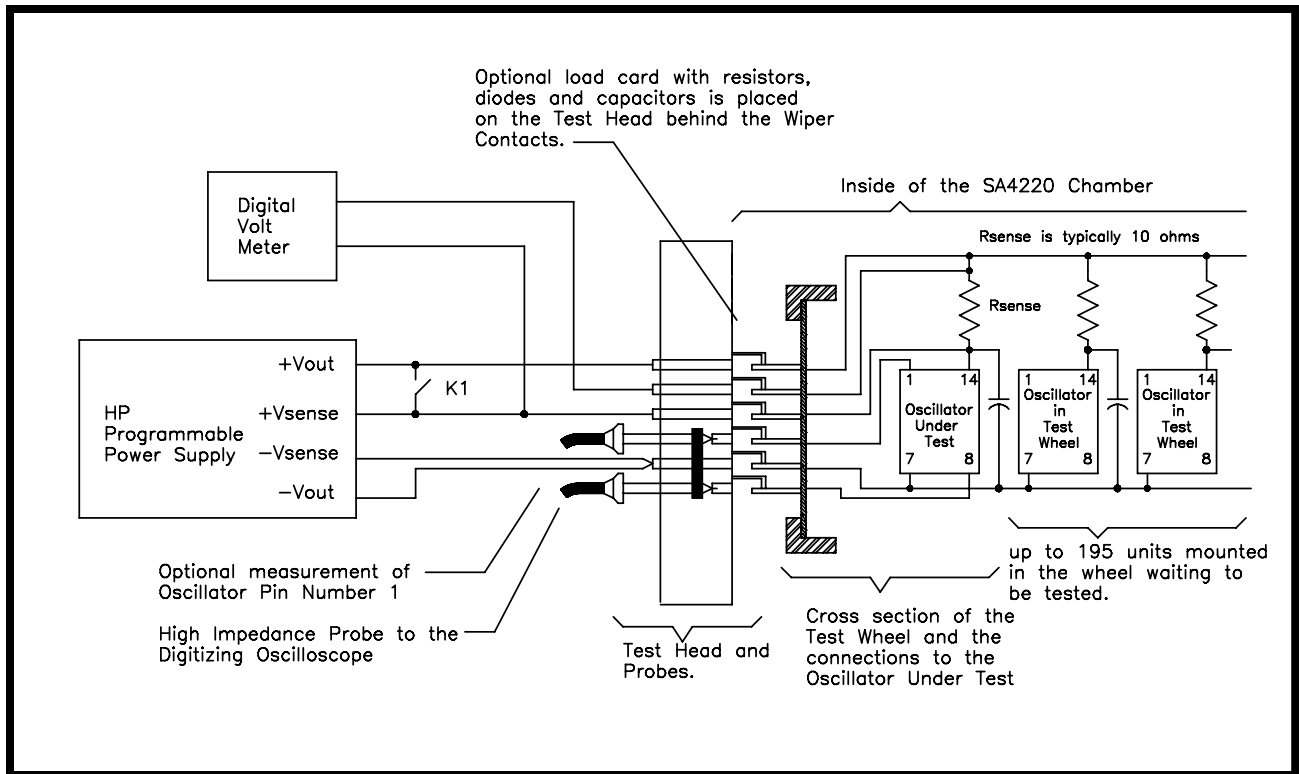
The test system data can be printed or formatted in several ways. The main system output is to move the data to an EXCEL sheet for end user manipulation

The limits input when the test procedure was written are compared to the test data. These limits will be in ppm deviation allowed from a reference temperature or frequency or supply voltage. The system will list all the oscillator data and then list all the devices that fail

the specification.

The data can be plotted, curve fitted, aging can be projected for data taken at a fixed temperature versus time, etc. These programs are all part of the supplied software with the system.

The printout program can also be operated on a PC that is not part of the test system. This permits data reduction to not interfere with testing.



2400G System Configurations

Test wheels:

Numerous standard test wheels exist, for DIP/DIL, SMT version of the DIP/DIL, Epson type SMT package, ceramic SMT, 5x7mm 4 pad and 6 pad version, 5x3.2 4 pad, etc. Test wheels can hold up to 196 oscillators depending on the oscillator size. Send the package outline drawing to PRA Inc. to help in test wheel selection.

BASIC 2400G (Round Chamber with up to 196 DUT Position Test Wheels):

Qty	Description
1	Computer PC, Windows XP Pro
1	Windows Compatible Printer (optional)
1	Digital Oscilloscope: Acqiris-Agilent DP214 with PRA output option.
1	Counter : Agilent 53131 or 53132 or 53181
1	DVM : Agilent 34401A
1	Power Supply: Agilent 6652A 0 to 20volts 0 to 25 Amps
1	PRA Model 6200 Temperature Test Chamber (optional S&A Model 4220 Chamber.)
1	BK Precision Power Supply, USB programmed
1set	System hardware and software PRA System Chassis, PRA Model 131B Relay Module IEEE488/GPIB Interface and cables, RF Coax Cables, DUT power supply cables PRA Mains Power Distribution box, PRA Model 6200 Series Chamber with cover TTL/CMOS or ECL load card and test head, PRA System software and manuals

The system is supplied in a 60 inch (1.53M) long chassis. All equipment is mounted in the chassis, the chamber is located in the center of the 3 sections. The power to the system is a single connection on the right hand section of the system.

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