Oscillator Bench Test System
Model 1020B

TCXO, VCXO, TCVCXO, Clock Oscillators includes display of the output waveform for TTL, CMOS, PECL, ECL. Sinewave, Clipped Sinewave

Ideal for -

Incoming inspection
In process oscillator setup
Manufacturing final test
Automatic Sorting

Features:

- Easy to follow menus
- Specification Entry Program
- Measurement Program
- Waveform can be viewed and printed
- Statistical Plots of Data
- Operates in Windows 95/98
- Uses a standard PC
- Data written directly to EXCEL
- Uses any MicroSoft Windows compatible printer
- Simple to attach test fixtures
- Test fixtures for various device types
  Optimized for bandwidth
  Optimized for ideal loading
- Bandwidth of over 500MHz
- 4 Programmable Supplies ±10V range

Measurements:

- Frequency
- Start Time
- Start Voltage
- Supply Current
- Waveform:
  T_{rise}, T_{fall}, Duty Cycle
  Overshoot
  Pulse widths
  V_{high}, V_{low}, V_{RMS}, V_{P-P}
- VCXO Pullability and Linearity
- Voltage to place on frequency
- Enable/Disable Function
- Warm-up Time
- Power Supply Sensitivity

PRA Inc.
4821 226th Place NE
Arlington, WA 98223 U.S.A.

TEL:360-435-0484
e-mail:sales@prainctest.com
www.prainctest.com

Model 1020 Description

The Model 1020 is designed to provide fast, simple to do, and accurate measurements of TTL, CMOS, ECL, PECL, sinewave and low voltage 3V quartz clock oscillators. Oscillators with special functions such as VCXO functions, enable/disable pin functions, pretest of TCXOs, etc. can be tested.

The Model 1020 is ideally suited for production final testing and incoming inspection. The specifications of the various oscillator types can be stored on the computer's disk to allow easy recall from a menu. The screen shows in a red background the tests that failed to allow easy analysis of nonconforming parts.

The Model 1020B uses a Gage-Tektronix 85G 500MHz BW scope card. The Model 1020 occupies 2 full length positions in the PC but only one PCI slot in the computer. Software is Windows 95/98 32 bit code. The computer must have MicroSoft's EXCEL 2000 or 2002 spreadsheet program installed.

The Model 1020 has three programs. The specification program permits entering and editing the specifications for the oscillators to be tested. The measurement program which operates in MicroSoft's EXCEL. The calibration program which is password protested.

The Model 1020 contains a simple controller. With the continuing evolution of the PC and the multi media complexity, the Model 1020 does not depend on the PC for timing and control. The PC only sends commands like those sent on the GPIB or RS232 to any other instrument and receives back status and data. The control is via the COM port of the PC.

The measured data can be printed as well as always being displayed on the screen. Measured data of up to 500 tested devices are accumulated to permit subsequent displaying or printing in statistical form. The data is stored in an EXCEL spreadsheet.

The logic level thresholds are programmable to any value within the oscillator's supply voltage. The % settings are of oscillator output amplitude. The output Vhigh and Vlow measurements are done using the peak level mode or the histogram mode.

The Model 1020 can test TCXOs. The pullability or deviation from several voltage points can be specified. Several data points can be measured and this frequency versus voltage function is then fit to the best straight line through the points. The error in % from the best fit is then computed and compared to user input limits.

The Model 1020 can be supplied with numerous test fixtures. These are optimized for each type of oscillator. When a specification is selected, the type of fixture is also selected before testing begins.

The standard Model 1020 fixtures do NOT have a Zero Insertion Force DIP/DIL oscillator test socket. These sockets do not have sufficient bandwidth and have far too much C and L strays. The basic set of contacts will permit mounting the test sockets for DIP/DIL and the various SMT parts. One of these sockets could be a ZIF type socket with the subsequent measurement degradation.

The Model 1020 is supplied with a calibration fixture to calibrate the oscilloscope, power supply set voltages and power supply currents. The counter can be operated referenced to an external standard.

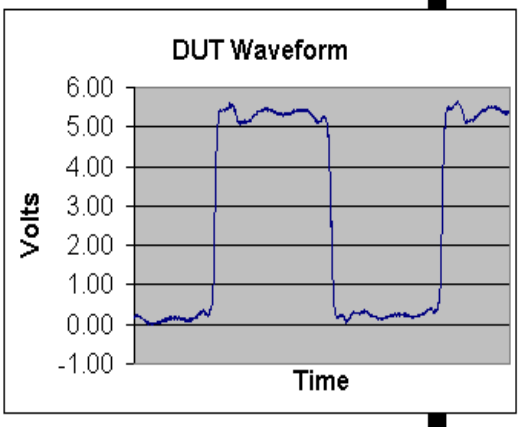
PRA will consider additional tests to the Model 1020. The Model 1020 is intended to continue to expand to meet the industries needs. For example a Tektronix TDS210 can be used for low frquency testing.

The PRA Model 2470/2474 is an expanded version of the Model 1020. The Model 2470/2474 had more capable software, other scopes can be used, for example the Tekronix TDS7404, TDS3052, TDS820, etc.

Internal Standard
32,500,000Hz

[Vdut 4.50] [Ven 2.40] [Vld 5.00]

Serial Number	STF(mS)	Abs Dev(ppm)	IS1(mA)	Tr(nS)	Tf(nS)	DC(%)	Vh(V)	Vl(V)	Out En()	Rel Dev(ppm)	IS1(mA)	Tr(uS)	Tf(uS)	DC(%)	Vh(V)	Vl(V)
DUT013	1.9	5.9	15.2	0.4	0.4	52.0	4.91	0.22	1	-0.4	11.5	0	0	51.5	4.41	0.20
DUT012	1.9	5.9	15.0	0.4	0.5	51.7	4.89	0.22	1	-0.4	11.6	0	0	51.4	4.42	0.24
DUT011	1.7	5.9	14.8	0.3	0.4	51.7	4.90	0.23	1	-0.4	11.6	0	0	51.4	4.41	0.23
DUT010	2.0	6.0	14.7							-0.5	11.6	0	0	51.4	4.43	0.24
DUT009	1.8	6.0	14.7							-0.5	11.5	0	0	51.7	4.43	0.20
DUT008	1.7	5.9	14.4							-0.4	12.0	0	0	51.4	4.42	0.21
DUT007	1.8	5.9	15.0							-0.4	11.8	0	0	51.2	4.44	0.21
DUT006	2.0	6.0	15.0							-0.4	12.2	0	0	51.4	4.40	0.24
DUT005	2.7	6.0	14.8							-0.4	11.8	0	0	51.4	4.40	0.20
DUT004	1.9	6.0	14.4							-0.4	11.4	0	0	51.4	4.40	0.20
DUT003	2.1	6.0	14.7							-0.5	12.1	0	0	51.5	4.42	0.21
DUT002	1.7	6.0	14.9							-0.4	11.9	0	0	51.4	4.40	0.20
DUT001	2.1	6.0	14.6							-0.4	11.5	0	0	51.5	4.43	0.20



Typical screen display with waveform of last waveform digitized (5.5V)

Model 1020 Specification

Counter:

Frequency Accuracy:	0.5ppm per 6 months with internal standard External standard permitted
Reading Speed;	0.1ppm resolution for a 260mS reading time.
Testing speed:	This will depend on frequency. Above 1MHz full waveform and frequency, 1.2 seconds
Minimum frequency:	100 Hz
Maximum frequency:	＞800MHz (scope BW is 500MHz)

Waveform Measurements:

Minimum Trise and Tfall:	300pS accuracy This will depend on the DUT and the test fixture selected.
Duty Cycle Accuracy:	0.15%
Oscillator Waveform Types:	TTL/CMOS Low voltage square wave ECL/PECL Sine wave and Clipped Sinewaves

Test Power Supplies:

DUT Power:	±10V up to 400mA. 5mV steps, 3mV accuracy
VCXO voltage Test Voltage:	±10V up to 100mA. 5mV steps, 3mV accuracy
Enable/Disable Test Voltage:	±10V up to 100mA. 5mV steps, 3mV accuracy
Load Circuit voltage:	±10V up to 100mA, 5mV steps, 3mV accuracy

Test Fixtures:

Test fixtures:	Specific fixtures for each type of device are required. This is predicated by the need for excellent lead length control and oscillator terminations for best accuracy. Supplied with DIP/DIL full and half size simulated TTL/ CMOS fan out of 10 load fixture.
DUT Loads:	The fixtures contains the loads. This minimizes the lead length.

Miscellaneous Requirements:

PC Requirements:	Windows 98/98SE required with MicroSoft EXCEL 2000 or later. Serial COM port Single full length PCI slot for the waveform digitizer and a free full length position (no insertion into the PC bus is made) 200watt power supply
Power Mains:	Power will be obtained internally from the PC. No power mains connection required.
Printer:	This is optional. Any printer compatible or supplied with MicroSoft Windows drivers will work.

Model 1020 Configurations

Model 1020B-K

This is the configuration to order when a PC already exists with MicroSoft Windows 98 or 98SE, COM port, minimum 1024 x 768 color display and MicroSoft EXCEL 2000 or later. Includes:

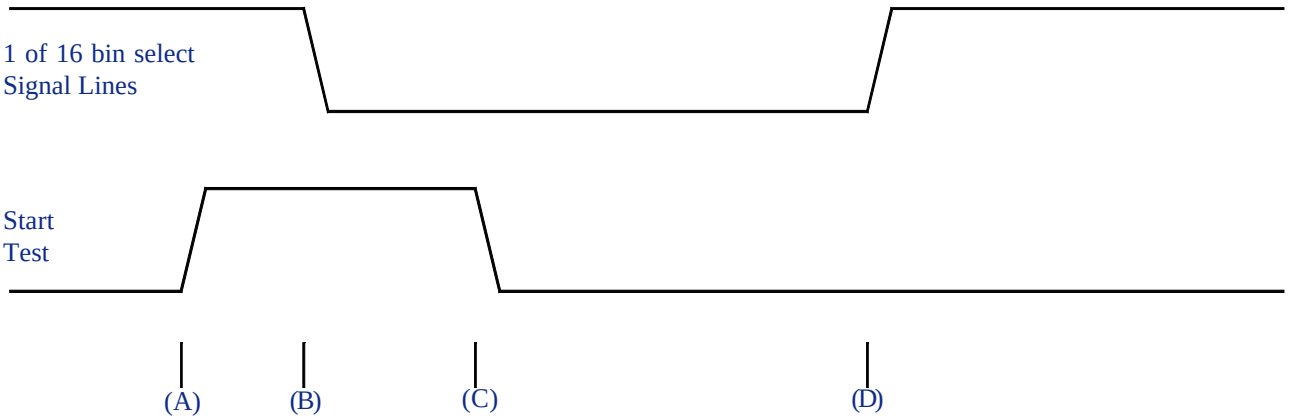
- Model 1020 Expansion Card with Gage-Tektronix 500MHz Scope
- Model 1020 Specification and Measurement Software
- Model 1020 System Cables
- Calibration Module for Trise, Tfall and Duty Cycle

Model 1020B-C

This is a complete system including the computer. Includes the 1020B-K and the computer:

- PC Minimum supplied capability:
  - Pentium 4 1.2GHz, 128MByte RAM, 10GByte HDD, 3½ 1.44MByte Floppy Disk
  - CD-RW drive minimum
  - 17" (less viewable) Color display
  - Model 1020A-K installed into the computer
  - MicroSoft WINDOWS 2000

Handler Interface Option



There are 16 signal lines, only one of which will be active at any time, and this line indicates into which bin to place the DUT.

After the handler has received a bin signal and performed binning, the handler can send a start test signal (A) to the Model 1020 to indicate a test can begin.

The Model 1020 will remove the bin signals as soon as possible (B). The Model 1020 will begin testing.

The handler must then remove or lower the Start Test signal (C).

When the measurements are completed and the Start Test line is low, the bin signal will be set (D). This sequence repeats for each DUT.

Other handler interfaces are also available. For example, the Extraon Handler with RS232 interface software interface is available.

Revised 8/20/02

Model 1020 DUT Test Fixtures

The test fixture can be supplied in many forms. The purpose of the fixture is:

- Provide a socket and contacts to the DUT
- Buffer amplifier to drive the scope's 50 ohm input (performs like a FET probe)
- Provide a load to the DUT
- Provide a start test button (also tests can be started from the PC screen)

Each fixture is serialized and has a calibration file that the system uses. This permits easy and rapid changeability between fixtures. The user selects from a menu which fixture is being used.

Special fixtures can be made for interfacing to handlers. PRA can assist the customer in making their own fixtures. The fixture has DC power and 8 TTL/CMOS lines available for various types of control options.

Fixture 1020-000 with optional Scope Probe Input

There is a compromise when performing RF measurements between simple to use fixtures and the best possible measurements with the best grounding and shortest leads. PRA provides fixtures that have been optimized for these options.

The fixture can have an optional Scope Probe input. This permits attaching a 50 ohm terminated scope probe to probe various points in the oscillator. Optional add-on software to the Model 1020 allows this probe to be operated as a typical scope probe would be.

Special dual output ECL/PECL fixtures and a universal fixture base are available.

Currently Available Test Fixtures:

Part Number	Description		Load
1020-000	TTL/CMOS	DIP/DIL	Simulated TTL/CMOS Load
1020-001	TTL	DIP/DIL	TTL Diode Load Fan Out of 10
1020-002	TTL/CMOS	5 x 7mm SMD	Simulated TTL/CMOS Load
1020-003	TTL	DIP/DIL	TTL Diode Load Fan Out of 5
1020-004	TTL	5 x 7mm SMD	TTL Diode Load Fan Out of 10
1020-005	TTL	5 x 7mm SMD	TTL Diode Load Fan Out of 5
1020-006	TTL/CMOS	J Lead SMD	TTL Passive Load Fan Out of 10
1020-007	TTL/CMOS	9 x 14mm 6 lead SG615	Capacitor load 15, 30, 50pF, jumper select
1020-010	CMOS	DIP/DIL	Capacitor load 15, 30, 50pF, jumper select
1020-011	CMOS	5 x 7mm SMD	Capacitor load 15, 30, 50pF, jumper select
1020-012	CMOS	9 x 14mm SMD	Capacitor load 15, 30, 50pF, jumper select
1020-013	CMOS	5 x 7mm SMD 6 lead	Capacitor load 15, 30, 50pF, jumper select
1020-014	CMOS	9 x 14 SMD 6 lead	Capacitor load 15, 30, 50pF, jumper select
1020-020	ECL/PECL	DIP/DIL Pin 7	Ground 50 ohm load
1020-021	ECL/PECL	DIP/DIL Pin 14	Ground 50 ohm load
1020-030	DIP/DIL DUT with plug in load device		Select load modules
1020-031		5 x 7mm SMD	Select load modules
1020-040	Sine wave	DIP/DIL Pin 7 ground	Sine wave 50 ohm load

All DIP/DIL fixtures support full and half size devices
Other fixtures can be made on request.