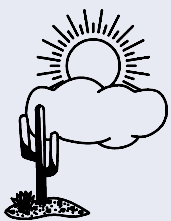


2360 Series Quartz Crystal - Oscillator Aging and Aging Measurement Test System

*Devices are operating while aging
Frequency Measurement made while aging*

- Up to 4000 devices simultaneously in a Model 2360 Oven
- Up to 2000 devices simultaneously in a Model 2361 Oven
- Up to 500 devices simultaneously in a user supplied oven for the Model 2362
- Up to 4000 devices in a dual high velocity air flow Model 2363 oven
- Devices placed in aging boards
- Measurement cycles and rate of reading are set by the user
- Frequency change versus time can be plotted
- Aging temperature range: 50°C to 125°C
- System controlled by a P.C.

Model 2360



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System Features

The 2360 Series Aging System permits aging crystals and clock oscillators at a user set temperature while the devices are oscillating.

The system consists of:

- Rectangular oven that has up to 8 slide out racks. Each slide out rack holds 2 aging boards.
- PRA Power Supply and Multiplexer. Provides power to the aging boards and provides the interface between the controlling PC and all of the aging boards.

The PRA Power Supply Multiplexer provides a clock and data signal to the aging board. The computer sends a data string serially to the card to select the one oscillator

- Period averaging frequency counter for high resolution with fast measurement times.
- Fail Safe thermostat sensor for the chamber. The sensor shuts down all power supplies to the aging boards if the chamber fails or exceeds a user set temperature.
- Each aging board has AC cut crystals placed in 2 positions. These crystals are used as quartz thermometers to measure the change in aging temperature. The aging temperature can

Model 2361



position on the card to be read. This signal is sent via 50 ohm coaxial cable to the Model 512 and then to the frequency counter.

- (Optional) PRA Add On Power Supply. Required to operate 8 aging board positions, permits full 16 board operation.
- The system is controlled by a PC.

be logged as part of the data.

The data reduction software permits analysis of the short term temperature changes on the measured frequency data. The effect of temperature change can be removed from the plots and printouts of the data. Equivalent chamber stabilities of 0.0025° C have been achieved.

Model 2362



- Each aging board contains the needed multiplex circuitry to permit selecting only 1 DUT on the PCB to measure. The on-board multiplexing is designed to minimize inter DUT signal radiation so precise measurements can be made.
- The aging boards may be partially withdrawn from the system to remove or add DUT's. The power supply connections are retained so that aging of other devices can continue uninterrupted. The slide out rack design also minimizes heat loss to the racks that are not extended.
- There are different aging boards

for various applications.

- The system is controlled by software supplied as part of the system. All test parameters are entered through menu driven programs.
- All entered test procedures are stored on the system controller's disk. To measure an already defined part requires the operator to select the desired specification from a menu and then testing begins. All equipment setup is auto-

matic.

- The system can be loaded with many different groups of devices. Groups of devices can be loaded/unloaded at any time and the status of the other groups in the system is unaffected.
- The aging status of any crystal can be displayed or printed at any time. The data can be in graphical or tabular form.
- The system is network compatible.

Device Aging Boards

The system can accept several types of aging boards. Any mixture of the board types is allowed. Each board is powered by:

- 5 volt 7 Amp supply
- +12 volt 7 Amp supply (optional)
- 12 volt 0.6 Amp supply (optional)

The aging board is held in the slide out rack assembly. When the aging board is plugged into the rack; the aging board receives power, the computer control signal and

outputs the selected DUT signal.

Wide Band Universal Crystal Oscillator Aging Board:

Devices to test are mounted in sockets on the burn-in board. Up to 254 crystals per board. TO5, HC45, HC49, UM1 packages.

The Fairchild Semiconductor wide band clock oscillator circuit, part CGS3311, is capable of properly operating to about 80MHz fundamental crystals.

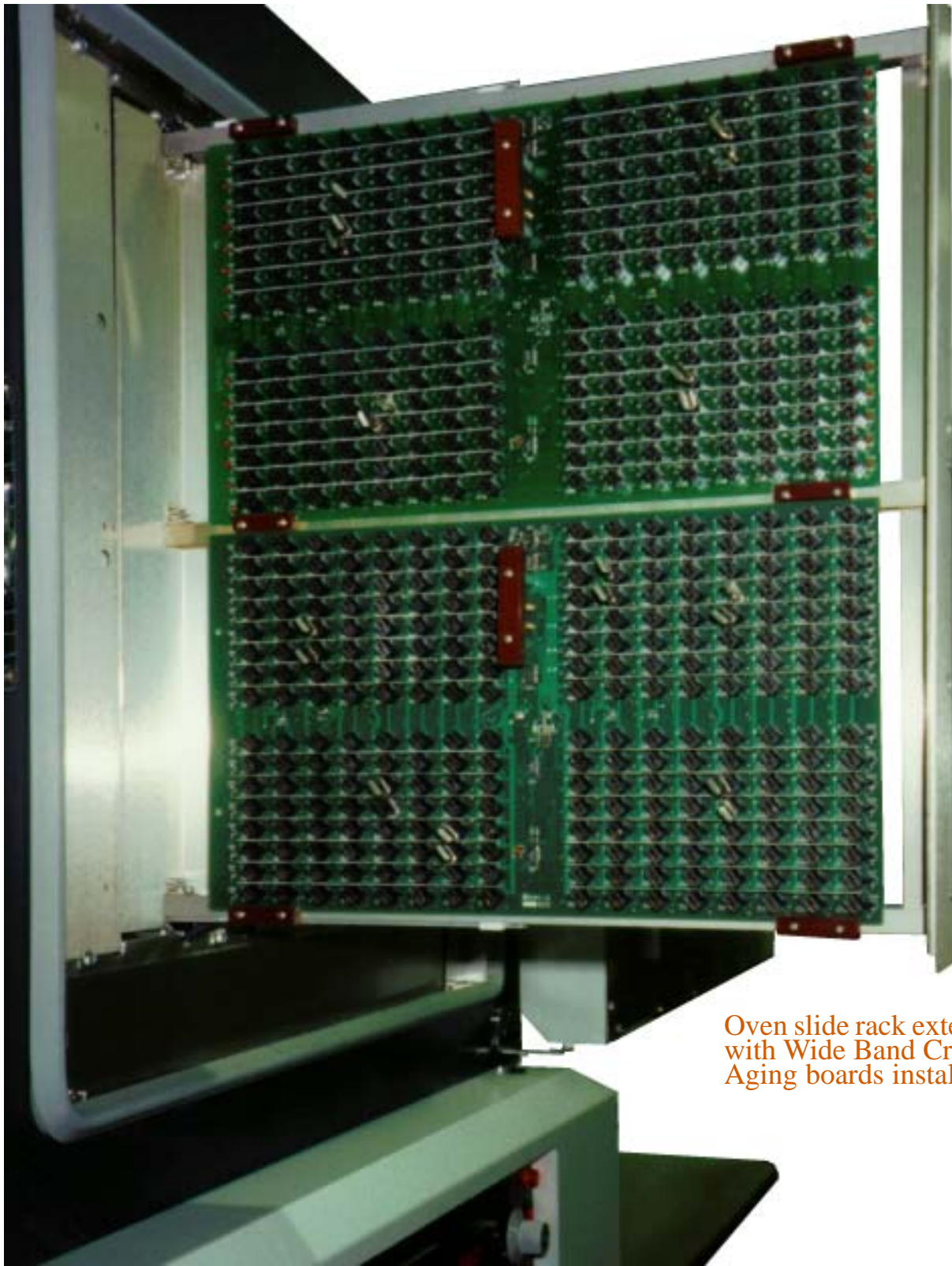
The circuit is a wide band device and normally will operate the crystal on the fundamental. In some cases, the overtone mode may be lower in resistance and the oscillator will operate on the harmonic. Drive level typically 150uW.

Model 2363



Aging oven with the door open. Each slide rack has an air flow baffle to isolate the other aging boards when the door is open or the slide is out.





Oven slide rack extended with Wide Band Crystal Aging boards installed.

High Frequency Aging Board: The board tests 254 crystals with a fundamental frequency range of 70MHz to over 225MHz. The crystals are operated in a wide band untuned oscillator.

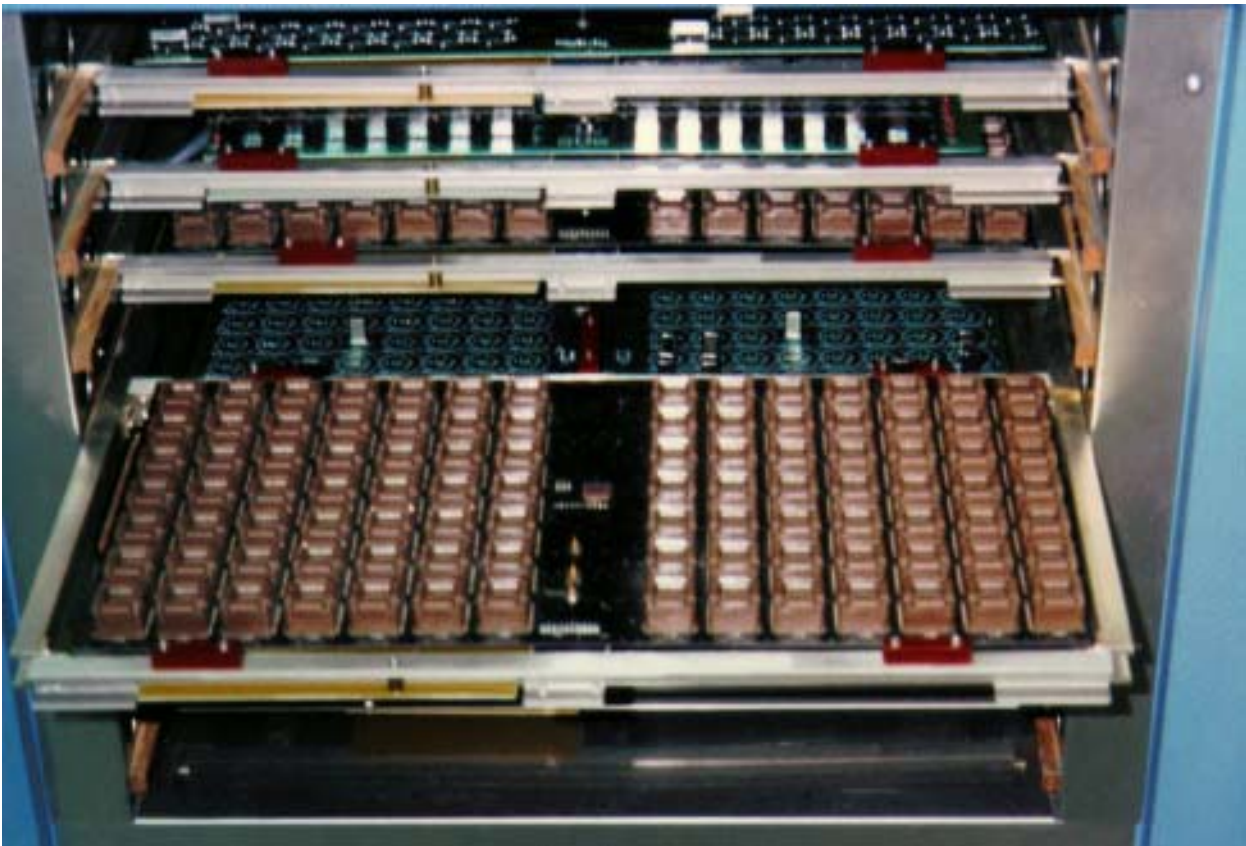
TTL/HCMOS DIP/DIL Clock Oscillator Aging Board: 254 Full Size or Half Size Devices to test are mounted in sockets on the burn in board. The board permits testing both ECL, TTL and HCMOS parts. The upper frequency range is over 1 GHz.

On the PCB are buffer circuits so the DUTs do not drive long leads. The output signal is prescaled to improve isolation and measurement accuracy.

QPL Type TTL/HCMOS DIP/DIL Clock Oscillator Aging Board: The board permits testing 126 Full Size or Half Size devices. The board can be set to have standard TTL or HCMOS loads. The loads are hard soldered on the boards. The upper frequency range is 100MHz.

40 Pin LCC Aging Board: The 98 devices to test are mounted in sockets on the burn in board. The board permits setting standard TTL or HCMOS loads. The loads are hard soldered on the boards. The upper frequency range is 100MHz.

SMD Aging Boards: Contact PRA about your specific needs.



Test Time and Test Sequences

The user can program the counter gate time (resolution) and how often to read a DUT. Each position in the chamber can have a unique test sequence.

Assuming 10ppb resolution is desired, a read time of 0.1S per device would be needed. The test time for a fully loaded system would be approximately 10 minutes.

The system permits a mixture of aging sequences. Some parts can be measured hourly, other parts can be measured monthly. These sequences are defined by the system user. Any measurement interval greater than the required measurement time is permitted.

System Configuration

Model 2360 System (4000 Devices Maximum):

The system (8 aging board positions and an optional 8 more board positions) consists of the following:

Oven: Lab Line Oven

Inside: 23w x 17.1d x 19.5h (in)
57.5w x 42.8d x 48.7h (cm)
Outside: 31.7w x 29.5d x 35.5h (in)
79w x 74d x 89h (cm)
LFE Mark IV Industries Controller
PID type temperature control
RTD sensor

Power Supply: PRA Model 512 powers the multiplexers and aging boards. Mounted on the rear of the oven.

Optional: Model 513 power supply and slide rack kit. This increases the capability to a full 16 aging boards.

Model 2361 System (2000 Devices Maximum):

The system (4 aging board positions and an optional 4 more board positions) consists of the following:

Oven: Lab Line Oven

Inside: 13w x 17.1d x 19.5h (in)
32.5w x 42.8d x 48.7h (cm)
Outside: 21.6w x 25.3d x 35.5h (in)
54w x 63.1d x 88.7h (cm)
LFE Mark IV Industries Controller
PID type temperature control
RTD sensor

Power Supply: PRA Model 514 powers the multiplexers and aging boards. Mounted on the rear of the oven.

Optional: Model 515 power supply and slide rack kit. This increases the capability to a full 8 aging boards.

Model 2362 System (254 or 508 Devices Maximum)

The system (1 or 2 aging board positions) and a customer supplied oven consists of the following:

Power Supply: PRA for one or two aging positions. Bench Mounted on the rear of the oven.

Model 2363 System (4000 Devices Maximum):

The system (8 aging board positions) which are in one high air flow oven. An optional second oven can be added to reach the full 4000 DUTs. The system consists of the following:

Oven: Blue M Oven

LFE Mark IV Industries Controller
PID type temperature control
RTD sensor

Power Supply: Mounted on the rear of the oven.

All Systems---

Controlling PC: Windows XP Pro PC with COM port.

Counter: Agilent/HP53181, 53131, 53132.
Data reduction software
Cables
Manuals

Aging boards: As needed.

Installation requirements:

195 to 240VAC, 50/60Hz (2 mains cords)

Oven power: 8 Amps maximum

DUT Power: 10 Amps maximum

95 to 125VAC, 50/60Hz (2 mains cords)

Oven power: 16 Amps maximum

DUT Power: 20 Amps maximum

Frequency Standard: 10MHz 150mV RMS minimum Sine wave or 450mV PP minimum square wave 500ohm load.

Stability of better than 1 ppb aging per year.

NOTE: PRA Inc. reserves the right to make changes to the product contained in this data sheet in order to improve the design or performance and to supply the best possible product. PRA Inc. reserves the right to make these changes without notice.

Revised 9/22/07