

NIST

Frequency Measurement & Analysis Service



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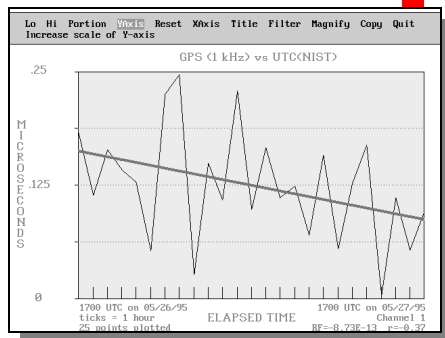
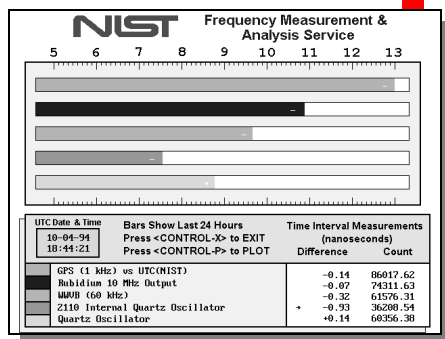
For Technical Support, please call:
(303) 497-3212 or (303) 497-3376

To Begin, Press Any Key.

NIST

A Complete Solution To All Frequency Measurement & Calibration Problems

The NIST Frequency Measurement and Analysis Service makes it easy to measure and calibrate any quartz, rubidium, or cesium frequency standard. All measurements are made automatically, and are traceable to NIST at an uncertainty level of $< 1 \times 10^{-12}$ per day.



All ☐ Demo ☐ Quit

Load selected data

Start Date		End Date	
Date	MJD	Date	MJD
07/12/95	49910	12/31/94	49717
12/31/94	49717	01/01/95	49718

Select the start and end dates using the arrow keys.
Press <ENTER> after making each selection.

Subscribers to the NIST service receive a complete frequency measurement system which they install in their lab. The system is housed in an attractive metal equipment rack, and includes everything needed to make state-of-the-art frequency measurements. An easy-to-read instruction manual makes installation a snap. Plus, all subscribers are invited to attend a free 2-day training seminar at NIST to get hands-on experience with the system.

Once the system is installed, it's easy to get started. Simply plug in the frequency standards you want to measure, and connect the system to a dedicated phone line. Up to five frequency standards can be measured and calibrated at once. The phone line allows NIST personnel to call your system, verify and analyze your data, and quickly troubleshoot any problems that may occur.

The system uses signals from the Global Positioning System (GPS) as a reference frequency.

The GPS receiver is software controlled and requires no operator attention. Your only requirement is to mount a small antenna in a location which has a clear view of the sky.

The measurement system blends commercially-available equipment with hardware and software developed at NIST. Measurements are made using a time interval counter with a single shot resolution of less than 40 picoseconds. The software completely automates the measurement process. It presents the measurement data in a clear, easy-to-understand format. When enhancements to the software are developed, NIST installs them for you by modem. If any hardware component fails, NIST replaces it immediately using an overnight delivery service.

While measurements are being made, a full-color bar graph displays the performance of each frequency standard over the last 24 hours. This bar graph is updated every hour. It

lets you see at a glance how well each standard is performing. Every 24 hours (at a time that you select) the system prints a full-page graph of each standard's performance. The graph documents the calibration in case questions arise in the future. You can also print a statistical summary of the data, or a listing of the data in tabular form.

The software allows you to graph the performance of a frequency standard over periods ranging from 2 seconds to 150 days. An array of powerful graphing features let you display the data in a variety of fashions: you can increase or decrease the scale of the y-axis, or "zoom in" on sections of the graph to show as much detail as possible. Plus, a powerful FILTER feature is included that automatically removes outliers and phase steps if you choose to do so.

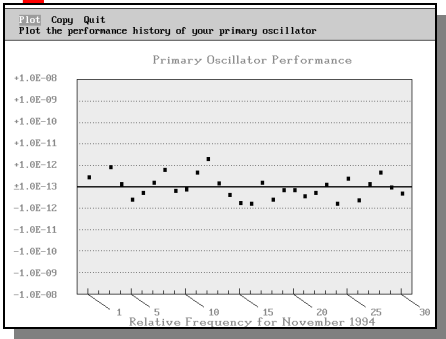
All of the data recorded by the system is stored on disk, and backed up on tape for redundancy. At any time, you can retrieve and graph past data

recorded by the system. This gives you a permanent history of all frequency calibrations made by your laboratory.

NIST regularly checks each system by modem to insure proper operation. NIST verifies the data from each system, and mails each subscriber a monthly report that certifies that their primary frequency standard is traceable to NIST.

The service complies with the requirements of NVLAP (National Voluntary Laboratory Accreditation Program). Subscribers to the service who seek accreditation in the frequency calibration field can reduce or eliminate the proficiency testing and on-site assessment fees charged by NVLAP.

If your laboratory calibrates frequency standards, the NIST Frequency Measurement & Analysis Service can be a welcome addition. The service provides a complete solution to all frequency measurement and calibration problems.



View channel one data

CHANNEL 1 - Cesium vs GPS

Number	MJD	Date	UTC	Drift (ns)
1	49613	09/18/94	17:00	-54.54
2	49613	09/18/94	18:00	-4.55
3	49613	09/18/94	19:00	-46.24
4	49613	09/18/94	20:00	-69.90
5	49613	09/18/94	21:00	-125.37
6	49613	09/18/94	22:00	-11.40
7	49613	09/18/94	23:00	-19.71
8	49614	09/19/94	00:00	-5.03
9	49614	09/19/94	01:00	-62.48
10	49614	09/19/94	02:00	-33.73
11	49614	09/19/94	03:00	-16.61
12	49614	09/19/94	04:00	-46.70
13	49614	09/19/94	05:00	-22.74
14	49614	09/19/94	06:00	-20.04
15	49614	09/19/94	07:00	-88.59

Press <PgUp> to move up 15 values, or <PgDn> to move down 15 values.
Press <HOME> to go to the top, or <END> to go to the end of the list.
Press <ESC> to return to the menu.

ShortTerm History GPS CalibrateTIC Quit
Show status of Global Positioning System (GPS) receiver

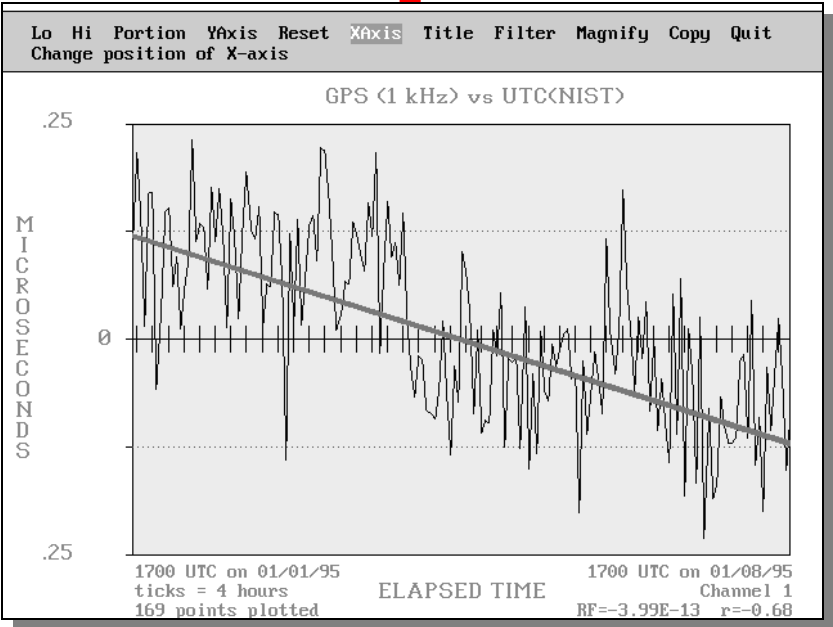
Current Status of GPS Reception
Press <ESC> to exit

Tracking Status (1 to 6)	6	UTC Date (MM-DD-YYYY)	10-14-1994
Signal Quality (0 to 9)	8	UTC Time (HH:MM:SS)	22:24:00

SATELLITES CURRENTLY BEING TRACKED

PRN Number	Health (AE)	Azimuth	Elevation	Correlator to Noise
23	HH	104	020	43
25	HH	179	039	51
21	HH	088	059	51
15	HH	313	030	51

The Frequency Measurement & Analysis Service provides NIST traceability, and meets NVLAP requirements for frequency calibrations.



NIST

Frequency Measurement & Analysis Service

Measurement System

Subscribers receive a measurement system consisting of the following items (the equipment remains NIST property):

- Metal equipment rack
- Rack-mount computer system
- Rack-mount color monitor
- Rack-mount keyboard
- GPS receiver
- Time Interval Counter
- Modem
- Printer
- Uninterruptible Power Supply
- NIST Measurement Software
- Illustrated Reference Manual
- All necessary cables & supplies

Training

All subscribers may send as many staff members as they wish to a free 2-day training seminar at the NIST laboratories in Boulder, Colorado (travel and per diem not included). The seminar covers the operation of the service, and general information about frequency measurements and calibrations.

NIST Support

NIST completely supports each subscriber. Questions about the service are answered by telephone on Monday through Friday, during normal working hours.

Parts that fail are replaced by NIST using an overnight delivery service. Subscribers are responsible for packing and shipping the defective part back to NIST in Boulder, Colorado.

NIST routinely checks each measurement system by modem to insure proper operation. Through the modem link, NIST can troubleshoot all hardware, software, and measurement problems. The measurement results are validated by NIST personnel, and monthly traceability reports are mailed to each subscriber. Each report includes an uncertainty statement.

Service Costs

The NIST Frequency Measurement and Analysis Service costs less than most alternative methods of obtaining high-accuracy, traceable calibrations. Costs are based on the development and operating expenses incurred by NIST.

Subscribers pay two fees: a one-time startup fee, and a monthly service fee. These are described below:

One-Time Startup Fee: \$1500

This fee includes the procurement, assembly and testing of the system. Each system is burned-in for at least one month prior to shipment. The fee also includes the cost of shipping the system to the subscriber's site.

Monthly Service Fee: \$500

This fee starts upon shipment of the system. It is a comprehensive fee and there are no hidden costs. It covers technical support, equipment replacement, data analysis, and all necessary supplies.

Payment and Delivery

Subscribers issue a purchase order to NIST for the startup fee, and for at least 1 year of service. Invoices are sent quarterly and in arrears. For example, after subscribing to the service for 3 months, you'll receive an invoice for \$1500 (for the service already received).

Delivery usually takes place within 30 days of receipt of an order.

For more information or to place an order, contact NIST using the address and phone numbers on the right side of this page.

NIST Calibration Number

The NIST Frequency Measurement and Analysis Service is listed in the *NIST Calibration Services Users Guide* as Service ID Number 76100S. You may reference this number when ordering.



NIST

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