

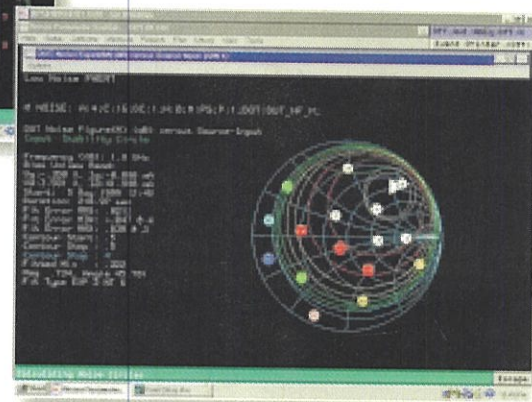
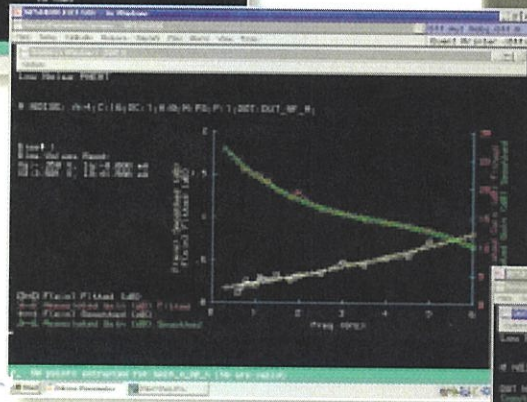
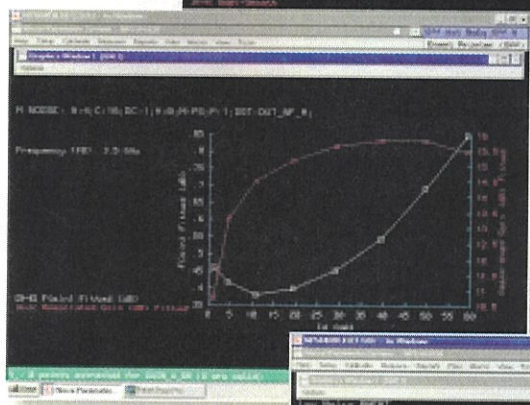
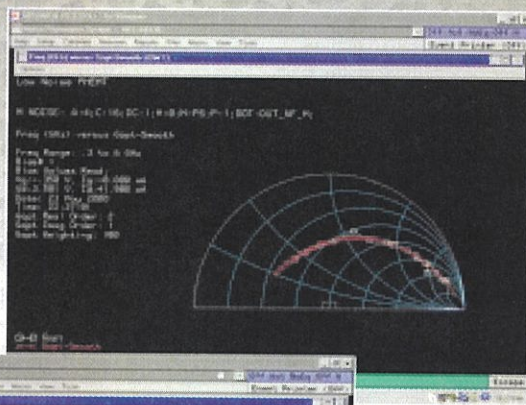


MAURY MICROWAVE
CORPORATION

ETS

ET

ELECTRONIC TUNER SYSTEM



NP5 Series Noise Parameter Measurement System

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technical data

4T-080

NP5 SERIES ELECTRONIC TUNER SYSTEM

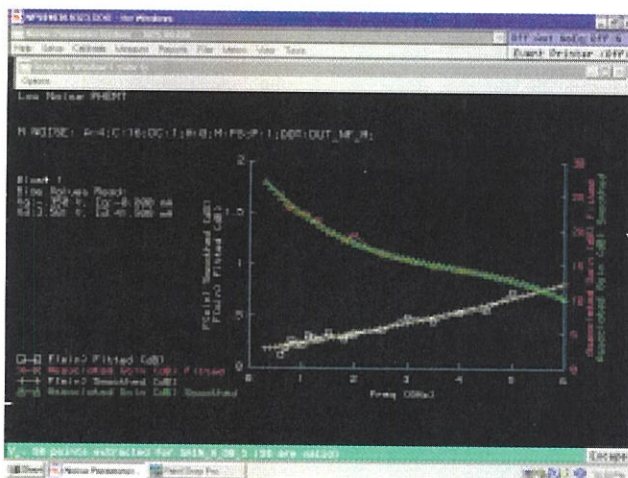
Complete Noise Characterization

The Maury Electronic Tuner System (ETS), NP5 Series Noise Parameter Measuring System is a solid-state tuner-based solution for complete small-signal characterization of RF and microwave semiconductor devices. From high-gain transistors with noise figures >1dB to millimeter-wave low-noise amplifiers, the Maury NP5 Series can handle the most challenging assignments.

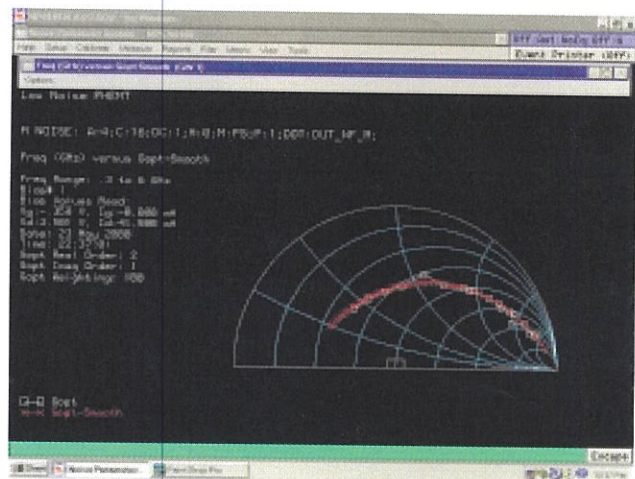
When combined with an Agilent vector network analyzer and an Agilent NFA series noise figure analyzer, the NP5 Series provides fast and accurate s-parameter, noise

parameter, and device characterization versus bias measurements and analysis from 300 MHz to 40 GHz.

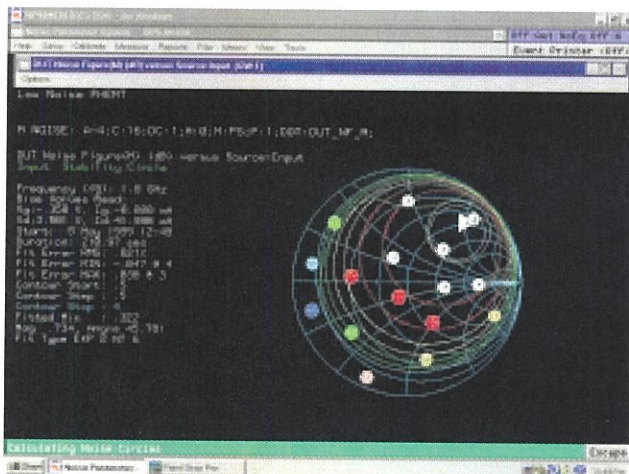
The noise parameter measurement software controls the system hardware, including power supplies for DC bias, and wafer probe stations (not included with the systems). Full test plans can be generated, and complex measurement sequences can be stored using the powerful built-in macro utility. Graphical and tabular report generation and data transfer to external electronic design automation (EDA) programs is fast and easy.



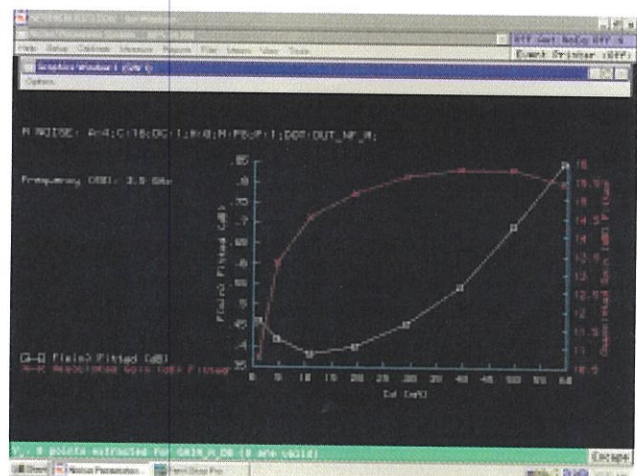
Example plot of F_{min} and gain versus frequency of a low-noise PHEMT. The device under test shows high gain with sub-1-dB noise figure.



Example plot of smoothed G_{opt} versus frequency of a low-noise PHEMT showing the optimum reflection coefficient.



Example plot of noise figure versus the source states presented by the input tuner to a low-noise PHEMT. Note the full spread across the Smith chart and noise circles.



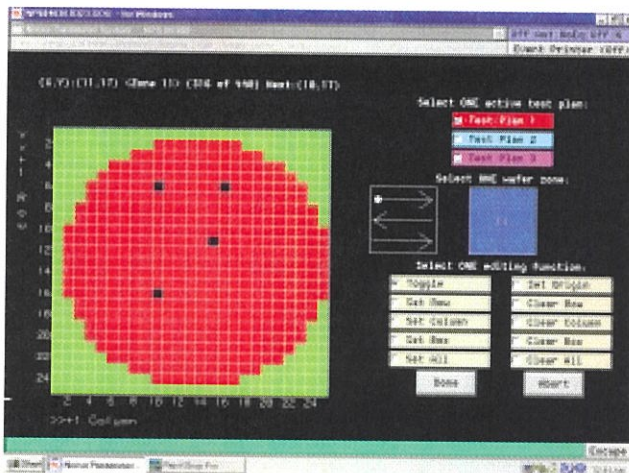
Example plot showing the tradeoff between high gain and noise figure versus current of a low-noise PHEMT. This type of plot is a valuable tool for selecting the optimum device bias.



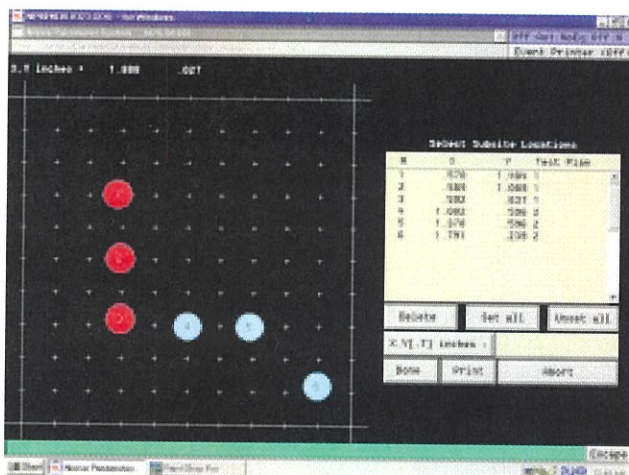
In-Fixture or On-Wafer Testing Support

Maury NP5 Series Noise Parameter Measuring Systems provide comprehensive support for in-fixture testing of packaged devices or circuits, or for on-wafer testing.

Ideal for transistor characterization, these systems can perform device-parasitic de-embedding. De-embedding provides the device's intrinsic noise parameters, which are important for the development of accurate noise models including device scaling and yield characterization. The system's integrated wafer environment enables automated characterization of entire wafers, and eliminates the expense and labor of dedicated test boards.



Example of a wafer map demonstrating some of the system's on-wafer test planning capabilities.

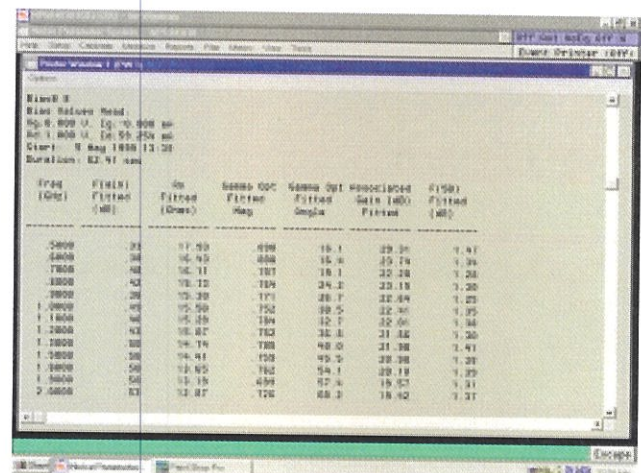


Example of a substrate (reticle) map, demonstrating some of the system's on-wafer test planning capabilities.

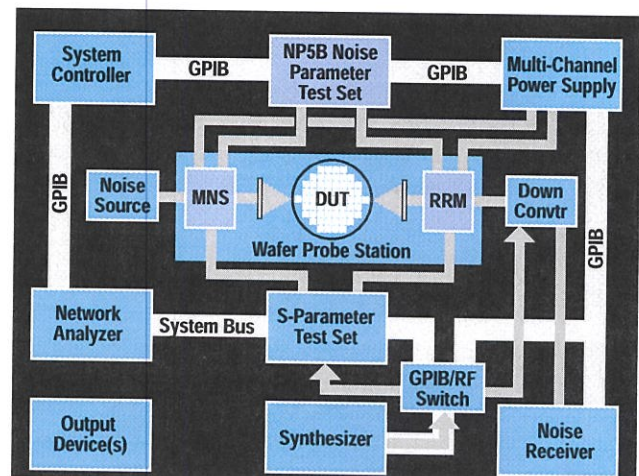
Designed for Maximum Accuracy

Overall measurement accuracy depends on the accuracy of the s-parameter measurements and the spread, repeatability, and number of impedance states used. Maury's NP5 Series Noise Parameter Measuring Systems are designed to maximize all of these. From the tuner's 369 impedances, a subset is selected that has the maximum vectorial difference at each frequency. This ensures a broad distribution in the impedance plane, across the entire frequency range.

To guarantee impedance repeatability and maximize the magnitude of the tuning mismatch, careful consideration is given to the design of the system hardware. For example, the system is designed without any switches between the tuner and the device under test (DUT). This allows more accurate measurement of smaller devices with higher reflection coefficients.



Example showing the device noise parameters in a tabulated, easy-to-read (and export) format.



Block diagram for a typical noise parameter measurement setup with the NP5 noise parameter test set, the MNS and RRM units and other test instruments.

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Standard Configuration

The Maury Electronic Tuner System (ETS), NP5 Series Noise Parameter Measuring System includes:

- A noise parameter test set electronic mainframe (EM)
- A mismatch noise source (MNS) and a remote receiver module (RRM)
- A noise and s-parameter measurement software bundle
- enhanced bias connectivity for the tuner modules (HBIAS)

A complete system, including a network analyzer, noise source, and noise figure analyzer, is also available (as are calibration kits, and connector gage kits). Please contact our Sales Department for detailed information.

Available Models

Frequency Range (GHz)	Model Number	Includes
0.3 – 6.0	NP5C001	1 ea. EM, MNS, RRM, Hardware Accessories, Software and Manual
2.0 – 26.5	NP5D001	

(Contact our Sales Department for higher frequency range coverage)

Dimensions (H x W x L)

Electronic Mainframe 133 x 426 x 437 mm
(5.25 x 16.75 x 17.25 in)
11 kg (25 lbs)

MNS and RRM* 90 x 140 x 40 mm
(3.54 x 5.51 x 1.57 in)
0.6 kg (1.3 lbs)

*MNS and RRM dimensions are frequency dependent. Those shown are for NP5D001 systems.

Specifications

Frequency range 300 MHz to 26.5 GHz (banded)
Resolution, NF and Gain 0.01 dB
Tuner range 1.1:1 to 10:1 369 States
Tuner repeatability <-50 dB (residual error vector)
Bias tee current Port 1: 125 mA fused
Port 2: 500 mA fused
RRM impedance 50 ohm nominal
Measurement speed S-parameters: see VNA specification
Noise Parameters (sec):
states (# avg) / 10 sec
Temperature Operating: 0° to 55°
Storage: -55° to 75° C
Power 100 to 240 volts AC (+5%, -10%),
48 to 66 Hz, 150 VA maximum

Data subject to change without notice.

About Maury Microwave Corporation

Maury Microwave Corporation specializes in RF device characterization measurement systems and solutions for communications, high-speed data, defense, and aerospace applications. Founded in 1957, Maury offers mechanical and solid state high matching range/high power tuners and automated tuner systems, active tuner systems, calibration standards and components, and a full range of precision coaxial and waveguide adapters.

Maury provides calibration, verification and repair services for all of the products we manufacture. In our state of the art microwave laboratory, we offer both ANSI/NCSL Z540-1 (MIL-STD-45662A) calibration and commercial level calibration. Our laboratory is ANSI/NCSL Z540-1 compliant with traceability to NIST (National Institute of Standards and Technology).

Periodic calibrations are available to maintain the mechanical and electrical integrity of your Maury products.

Maury Microwave Corporation is an ISO 9001:2000 compliant company.



Agilent Technologies

Channel Partner

Contact Information

Please contact your nearest Maury Representative or call our Sales Department at:

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Tel: (909) 987-4715 Fax: (909) 987-1112

For the ETS Product Line (NP5 Series and LP Series Load Pull Systems):

Eric Kueckels (ekueckels@maurymw.com)

Don't Forget to Visit Our Web Site at

www.maurymw.com