

## Advanced Low Frequency Noise Measurement System

### Introduction

Primarius 981X series are the industry's de-facto standard flicker noise (1/f noise) measurement systems. Flicker noise is the dominant noise for deep sub-micron and nanometer CMOS, bipolar junction transistor (BJT), field effect transistor (FET) and heterojunction bipolar transistor (HBT) devices. 9813DXC excels in measurement speed, system resolution and coverage of different types of measurement requirements for flicker noise and random telegraph noise or signaling (RTN or RTS).

9813DXC includes an order of magnitude improvement in measurement resolution compared with the legacy systems.

It supports almost all device types under wide operating conditions, including high voltage up to 200V and extreme low current down to 10pA. It can accommodate a complete range of measurement conditions for both high and low impedance devices, ranging from 10Ω to 10MΩ.

9813DXC delivers a significant and innovative improvement in hardware and software design to meet the challenge of explosive growth requirements for low frequency noise test of advanced technology nodes, especially FinFET technology.

With a typical noise measurement speed of 20 sec/bias, 9813DXC can be used in conjunction with the Primarius semiconductor parameter testing system FS-Pro, providing a parallel testing framework solution that significantly improves testing efficiency and throughput.

### Key Advantages

#### Ultimate resolution

- Multiple built-in LNAs provide the widest impedance matching range

#### Full device type coverage

- Supports MOSFET, SOI, FinFET, TFT, HV/LDMOS, BJT/HBT, JFET, Diode, Resistor, Packaged IC, and other device types

#### Highest speed

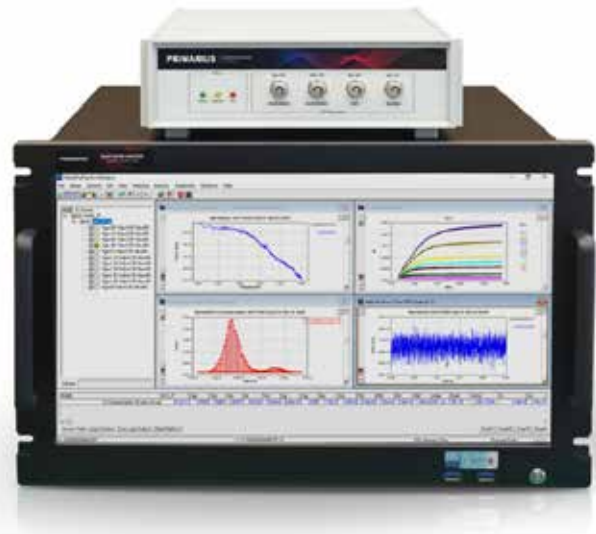
- Fast noise measurement speed and efficient statistical noise analysis

#### Wide range of technology nodes

- Applies for 14/10/7/5nm technology node

#### Hardware architecture

- Innovative system architecture for system integration
- Intuitive touch screen for easy operation



### Applications

- Process quality evaluation and monitoring for advanced technology (FinFET/FD-SOI/GaN) development
- Noise characterization for SPICE model extraction
- Process/Device evaluation for advanced circuit designs

### Hardware Specifications

#### Wide range

- Maximum input SMU voltage and currents: 200V and 200mA

#### High accuracy

- Minimum DC accuracy: 10pA
- System noise current resolution:  $<10^{-27} \text{A}^2/\text{Hz}$

#### High speed

- 20 sec/bias for typical device 1/f noise

#### Wide impedance range

- DUT impedance ranging from 10Ω to 10MΩ

#### Input/Load resistors

- 16 Gate/Base options, 15 Drain/Collection options
- Voltage LNA: 0.03-10MHz,  $0.65\text{nV}/\sqrt{\text{Hz}}$  (@5kHz)
- Current LNA: 0.03-1MHz,  $0.7\text{pA}/\sqrt{\text{Hz}}$  (@5kHz)
- Wideband current LNA: 0.03-10MHz,  $5\text{pA}/\sqrt{\text{Hz}}$  (@5KHz)
- High precision current LNA: 0.03-20KHz,  $60\text{fA}/\sqrt{\text{Hz}}$  (@5KHz)
- Built-in ADC and DSA, ESD DUT Protections
- Supports parallel tests with multiple equipment

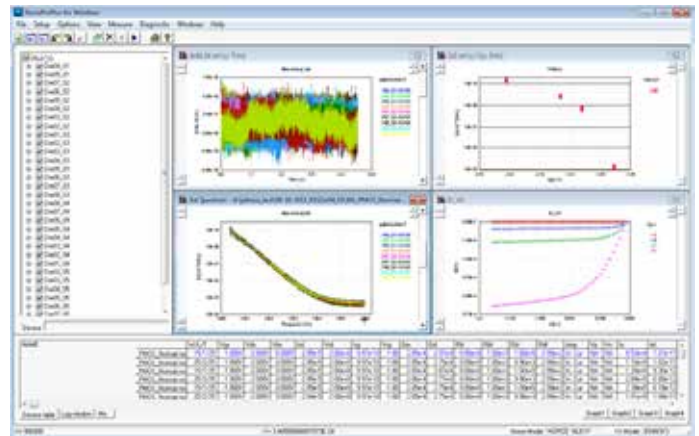
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### Software Specifications

NoiseProPlus, 9813DXC's built-in software, is a powerful tool for measuring and analyzing 1/f noise and RTN noise.

#### Specifications

- Drivers for 9813DXC, 9812DX/D/B/A, and almost all popular IV meters
- Drivers for Cascade/SUSS/MPI probe stations
- Multi-mode device and bias auto-measurement control
- Simultaneous 1/f and RTN noise characterization
- Statistical noise characterization and analysis
- Rich graphical feature and data analysis



### Application Examples

