Auto-Measurement by MPI Probe Station with SENTIO® Software Suite in NoiseProPlus™

NoiseProPlus™ can control MPI semi-auto probe station (e.g. TS3000-SE) with SENTIO® Software suite V2.8.0 to measure the 1/f noise automatically. The procedure for auto-measurement is described in this document. The following general steps are followed in a typical 1/f noise measurement setup using NoiseProPlus™.

■ Load Wafer on the Probe Station

To load a wafer on the probe station correctly, you need to get more detailed information from the user's manual of MPI TS3000-SE probe station series. Listed below are some general guidelines:

(1). Move the chuck to load position.
(2). Remove vacuum.
(3). Put a wafer on chuck.
(4). Add vacuum.
(5). Align wafer to alignment position.
(6). Create a wafer map for die and subdie to measure by using wafer map editor.
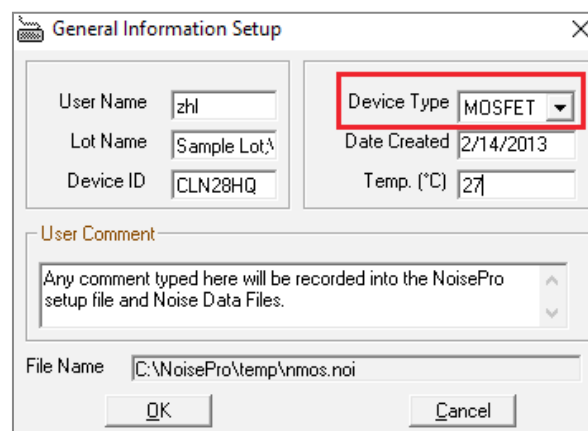(7). Make sure the chuck can move to the correct position of die and sub-die using this wafer map at alignment height.

Figure 1. General Information setup

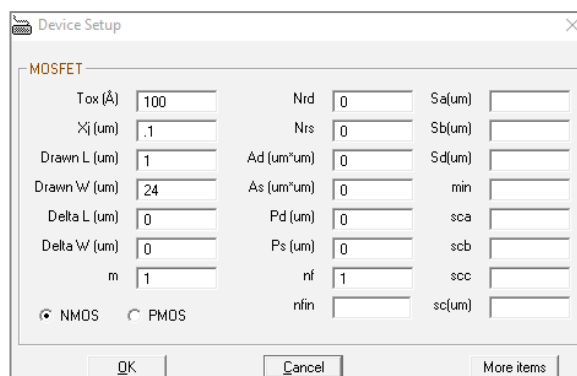## ■ Configure a New Device on NoiseProPlus™ Software

To configure a new device to be measured, launch the NoiseProPlus™ software and select the appropriate device type from the toolbar menu **Setup → General Information Setup** as shown in fig. 1 above. We will use a NMOS device in this application note. Next click on **Setup → Device Information** to fill out instance parameters as needed as shown in fig. 2 below.

Figure 2. Device Information setup

■ Setup the IV Meter, Spectrum Analyzer and Noise Analyzer

To setup each of the hardware items, click on the toolbar menu **Setup → Measurement Setup** and browse through each tab to configure items such as IV meter, Spectrum Analyzer and Noise Analyzer shown below in fig. 3.
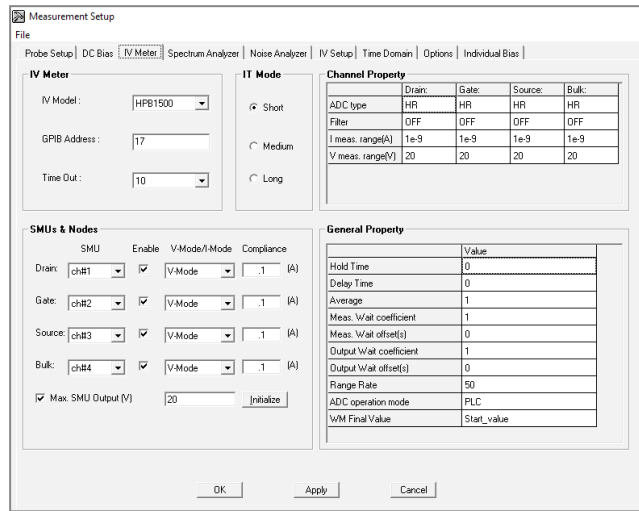

Figure 3. Measurement setup

■ Setup Probe Station

To setup the probe station, click on menu **Setup → Measurement Setup → Prober Setup**. Enable the **Use Prober** option (if disabled) and select **Nucleus with GPIB** (emulator mode) from the Prober Model. Set the correct GPIB address and click **Start** to test the connection between software and prober as shown in fig. 4 below. Note there is no need to specify the MPI Prober Driver Path (grayed out) when controlling the probe station in emulator mode. It is also important to note that SENTIO® software suite is capable of interpreting Cascade Nucleus commands.
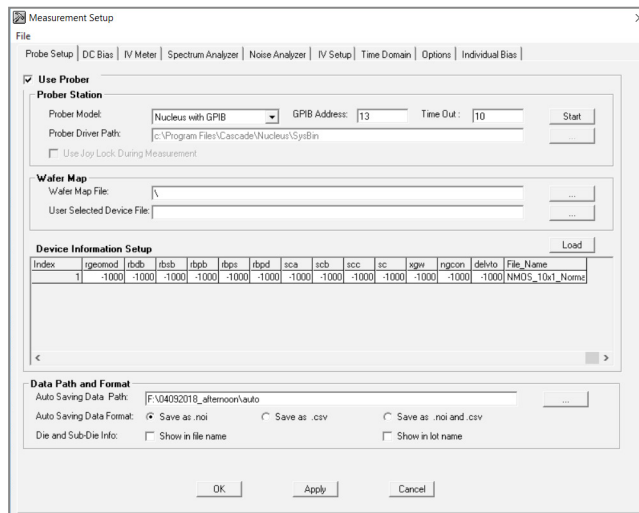

Figure 4. Prober setup

Next load the wafer map in SENTIO® as shown in fig. 5 below. User may manually select the dies to be tested and export the wafer map to the desktop or import an exsiting wafer map file with a .trex extension. Browse for the **Wafer map file** copied from the probe station computer to the location accessible by the NoiseProPlus™ if SEN-TIO® and NoiseProPlus™ are installed on different machines. Note this step is optional since NoiseProPlus™ can automatically move the prober from die to die when the wafer map file is loaded on the probe station. In order to complete the prober setup, device information setup needs to be loaded by clicking the **Load** button after having filled the necessary DUT details as shown in fig. 4 above. NoiseProPlus™ automatically saves the noise data to a default temp path which can be edited by the user to a specific location alongwith the desired noise data format. Die and sub-die information can be embedded in the saved data filename by clicking on the appropriate option under **Data Path and Format**. Once the setup configuration is complete, hit **Apply** then **OK** to load the full setup in the device tab.
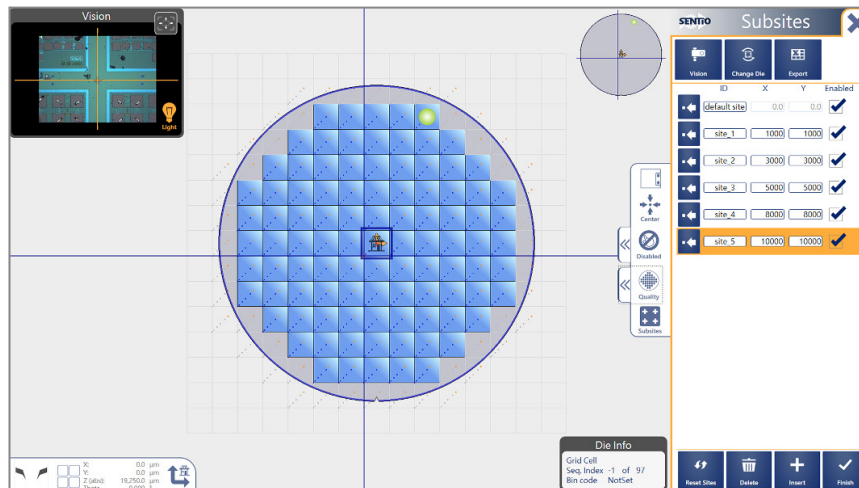

Figure 5: SENTIO® Software Suite: Wafer map setup (GPIB)

■ **Auto-Measurement**

NoiseProPlus™ automatically understands the setup as auto-measurement when the **Use prober** is enabled and multiples dies (and/or sub-dies) are selected on the wafer map in the emulator mode described above. Now from the menu, select **Measure → Measure Noise** and a new window **Sid Spectrum DSA channel:1** window appears, select **Measure → Measure 1/f Noise** to start the measurement. User may also select **Measure → Measure 1/f Noise for Multi-Device** in the measurement window. NoiseProPlus™ will then load an auto-measurement multi-device script file, measure noise from die-to-die, subdie-to-subdie and save the data to your directory automatically.
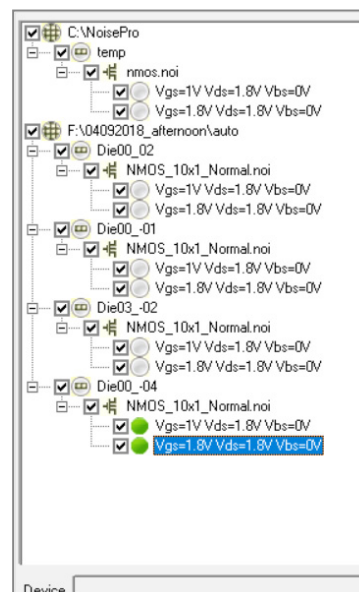

Figure 6: NoiseProPlus™ device window displaying multi-die noise data

Note that auto-measurement procedure is identical to the manual measurement steps except that the software internally loads a new script file for auto-measurement when wafer map information is available. NoiseProPlus™ creates multi-die noise data tabs under the folder specified in auto-measurement mode as shown in fig. 6 above. This multi-die data can then be super-imposed to visualize the across wafer noise variability.

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