INTEGRATING H1000 THERMAL CHUCK CONTROL WITH METRICS ICS

Application Note

Introduction

Electrical measurements (such as CV and IV) are often required to be made at temperature. While Metrics ICS does not have a software driver to control a thermal chuck system, there is a convenient way to communicate with H1000 Thermal Chuck controller to perform a set of tasks (heat, cool, soak) before each measurement is made and after each measurement is complete using a user feature in ICS.

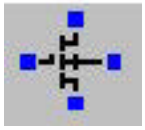
This Application Note explains a step by step procedure to incorporate H1000 Thermal Chuck Control with test setups in ICS. The information provided here assumes that the user has a working knowledge of ICS.

Interactive Characterization Software (ICS) is a full featured software tool that combines:

- The measurement capability of many types of test equipment
- The ability for semi-automatic probe stations to step around a wafer
- The power of software to
- Use pre-defined test setups
- Save measurements in a database
- Define arithmetic transforms to calculate quantities from raw measurement data
- Apply pass/fail test criteria
- Provide plotting capabilities for report generation

How is it done?

Each test setup in ICS has a provision for the execution of user programs. These programs can perform virtually any function that the user needs executed either before or after a measurement (or both). These functions may include device initialization, device configuration or, for our purposes, Figure 1 shows the opening screen that appears when ICS is started. After selecting an instrument, click on the Test Setup icon to display the Test Setup Editor show in Figure 2.



You may open an existing Test Setup or create a new one. Until an existing Test Setup is opened, the New icon is the only active icon available. Click on the New icon to create a new Test Setup and give your Test Setup a name. Once a name is assigned to the Test Setup, click on the User Program icon to display the User Program Execution screen as shown in Figure 3.

Set the Execution Mode to either “Pre-measurement” or “Post-measurement” for the H1000 Thermal Chuck control program to be executed either before or after the measurement.

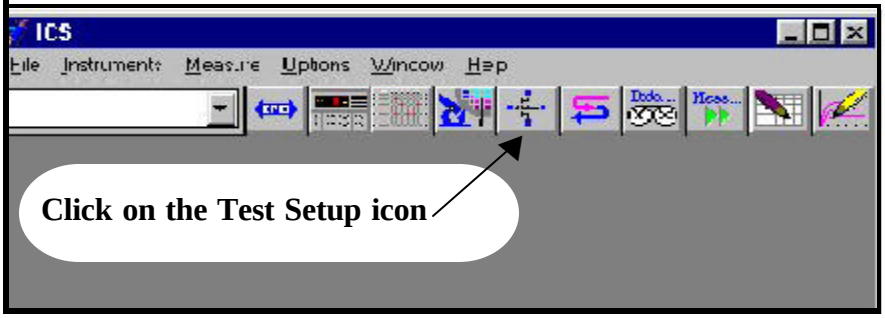
Set the Execution Timeout to allow enough time for the thermal chuck to reach temperature plus any additional soak time.

Set the Options fields as shown in Figure 4. Set the Program Type to “DOS” and set the View option to “Show.”

The H1000 Thermal Chuck Control program (H10RS232.EXE) is a DOS program which accepts command line parameters to determine what action the H1000 Control should execute. Table 1 explains the details of the command line syntax for H10RS232.EXE. Here are three examples of the H10RS232 command line usage:

Figure 2

Figure 1



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C:\ICS\H10RS232 /P=1 /H=200 /+++ /S=35
This command tells the H1000 Thermal Chuck System to use COM1 for communications with the H1000 Controller, heat and maintain 200°C, and soak for 35 minutes.

C:\ICS\H10RS232 /P=2 /H=250
This command tells the H1000 Thermal Chuck System to use COM2 for communications with the H1000 Controller and heat to 250°C. Note that this command line does not contain the /+++ parameter and so the H1000 controller stops heating after the thermal chuck reaches 250°C.

C:\ICS\H10RS232 /P=1 /C=-25 /+++ /S=15
This command tells the H1000 Thermal Chuck System to use COM1 for communications with the H1000 Controller, cool and maintain -25°C, and soak for 15 minutes.

Type the complete H10RS232 command line on the Command Line entry field (ref. Figure 4). Click on the Save Command to List button after the command line is typed in.

Figures 5 and 6 show examples of pre-measurement and post-measurement setups in ICS using the H10RS232 command line program.

Figure 5 shows a User Program setup to heat and maintain the thermal chuck at 150°C and to let it soak for 30 minutes before executing the measurement.

Figure 6 shows a User Program setup to cool the thermal chuck to 25° C and to let it soak for 10 minutes after executing the measurement. Note that since the post measurement command line does not have the /+++ parameter, the H1000 Cool controller will stop controlling when chuck reaches 25° C.

The editing buttons (Append, Edit, Cut, Insert, Replace and Delete All) on the lower right area of the screen can be used to edit the list of commands to be executed. Click on the Done button when the correct H10RS232 command appears in the List of Command to Execute field.

These instructions will allow you to add control of the H1000 Thermal Chuck System to any ICS Test Setup. The H1000 Thermal Chuck control functions independently of the type of test equipment or measurement being made.

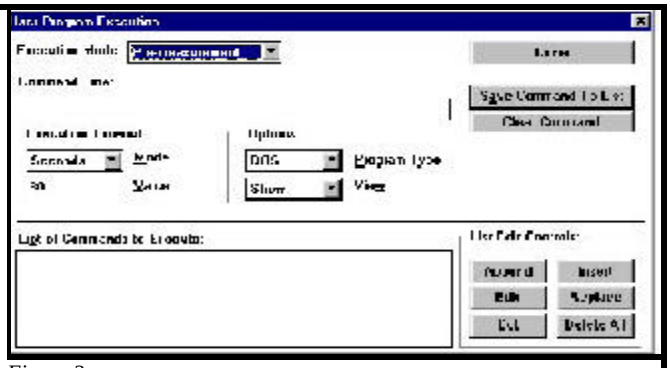

Figure 3

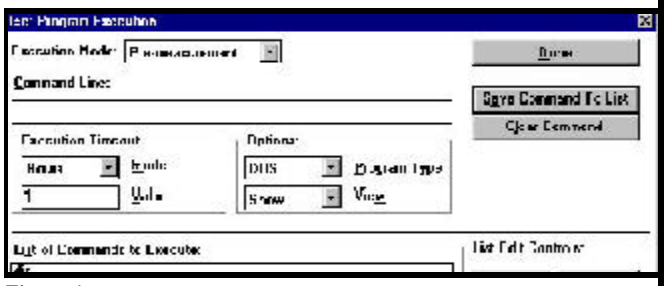

Figure 4

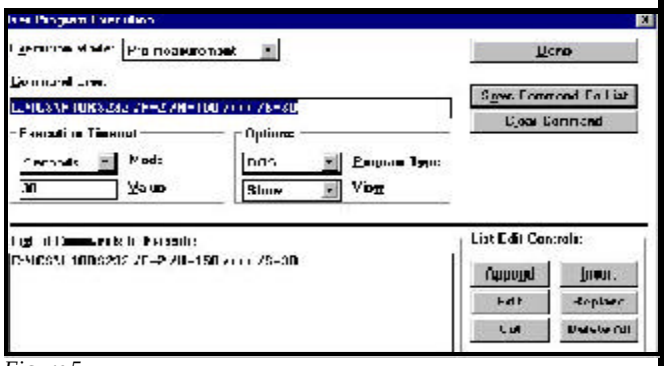

Figure 5

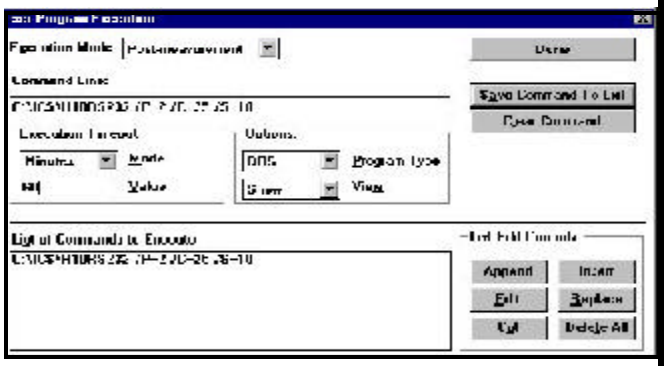

Figure 6

Equipment requirements:

- Computer with Windows 3.1 or '95
- ICS version 3.0 or later
- Available RS-232 communications port (COM1 or COM2)
- H1000 Thermal Chuck System with H1000-RS-232 interface

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Command line:

H10RS232 /P=X [/H=XXX.X] [/C=XXX.X] [/S=XXXX] [/+++] [/STOP]

where:

/P=X	X=1 or X=2. Selects COM port X for H1000 communications
/H=XXX.X	Changes the Heat Controller set point to XXX.X degrees C and executes HEAT mode. The H1000 system stops heating when the heat set point is reached, unless the /+++ switch is included.
/C=XXX.X	Changes the Cooling Module set point to XXX.X degrees C and executes COOL mode. The H1000 system stops cooling when the cool set point is reached unless the /+++ switch is included.
/S=XXXX	Performs a temperature SOAK for XXXX minutes after the heat or cool set point is reached prior to program termination.
/+++	Leaves the H1000 system in either HEAT or COOL mode after the program terminates.
/STOP	Sends commands to both the Heat Controller and the Cooling Module to stop controlling temperature.
Notes:	The command line must contain the /P and either a /H or /C switch. If both /H= and /C= switches are used, only the /H= switch is executed. If both /H= and /C= switches are used, only the /H= switch is executed.