

## Magnetostrictive Device Probe System Reference Guide

### Location

The magnetostrictive device probe system (MR prober) is located in the Data Storage System Center's Magnetic Recording Heads Laboratory (Roberts Engineering Hall room 305). It is at the rear of the lab, near the east windows. Access can be obtained by contacting the appropriate personnel.

### Quick Start

The following should be used *only* as a quick reference guide. New users should read this guide thoroughly before continuing with an experiment.

This quick start section assumes that all devices are powered off, the wafer with the devices to probe has not been placed in the system, and the computer display shows the typical Windows 95 logon screen.

1. Log onto the system using the username "mr\_prober"; the password can be obtained from the appropriate personnel. Start up the control system by double clicking on the "MR Prober" icon on the desktop.
2. Turn the power on to the devices on the bench: the two multimeters, precision current source, and lamp.
3. Turn on each power supplies by flipping the black bar in the upper left corner of the front panels upward. Check to see that they are functioning properly, i.e., that the current and voltage levels remain at zero. **If either power supply suddenly swings to either the positive or negative rail, turn off both supplies IMMEDIATELY and locate someone in charge of the lab.**
4. Enable communication between the computer and devices by clicking on the red "CONNECT ALL GPIB" button in the MR Tester window.
5. Put the anti-static wrist strap on.
6. Place the wafer to be tested onto the stage. Be careful to align it properly with the longitudinal and transverse field directions. These directions are marked on the stage with arrows and the letters 'L' and 'T', respectively.
7. Make sure that each probe has its incremental height set so that it will not come into contact with the wafer when the probe stage is lowered.
8. *Carefully* lower the probe stage by loosening the two knobs on the right. **The stage is not suspended by springs or any other mechanism! You must keep the stage from crashing by holding onto it firmly.**
9. Move the microscope eyepiece so that it sits over the wafer.
10. Using the wafer stage positioners, move the wafer into position underneath the desired probes.
11. Move the probes into position over the contact pad by adjusting the fine positioning knobs on each probe block. Use the reflection of the probe off the wafer as a guide since perspectives can be misleading.
12. Lower each probe onto the pad. Some additional force is necessary to make good contact between the probe and the pad. This will damage the pad slightly — this is normal and should be expected.
13. If the current to be used by the device is known, simply enter

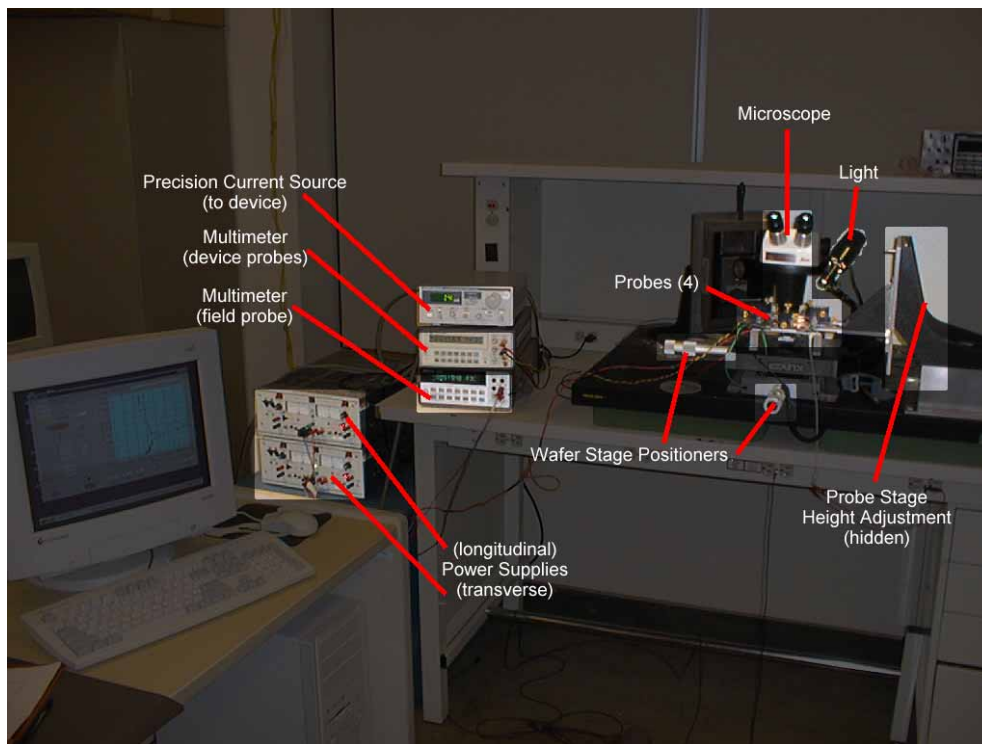


Figure 1: The MR prober with selected equipment highlighted.

it into the “Current” field of the software — it is not necessary (though a good idea) to enter the dimensions of the device. Otherwise, the desired current density and dimensions of the device must be entered into the remaining fields. The required current will be computed automatically.

14. Select either a longitudinal or transverse field on the switch below the “CONNECT ALL GPIB” button.
15. Select a scan mode. “Standard” will start the scan at the positive saturation field and sweep to the negative saturation field using the specified step size. “Symmetric” uses a smaller step size between  $\pm$ Hi\_Res\_H. “Asymmetric” uses a smaller step size when the field is between Hi\_Res\_L – Hi\_Res\_H and Hi\_Res\_L + Hi\_Res\_H.
16. If you wish to sweep in the reverse direction (i.e., from the negative to the positive saturation field), change the “Start from” parameter to “Negative.”
17. Enter the saturation field to be used in the “Sat Field” box. The step size can be entered in the box to its lower right. For the symmetric scanning mode, also specify Hi\_Res\_H and the small step size as described above. For the asymmetric scanning mode the Hi\_Res\_L parameter must also be entered.
18. If you wish to change the sampling frequency, number of samples per measurement to average, or the hold time, specify these parameters in the boxes in the lower left corner.
19. Once the scan is ready to be run, click on the red “Run” label. **Note: once started, the scan cannot be interrupted.**
20. After the scan is completed, click on “Save” to move the data out to a disk.
21. After the measurements are completed, shut down the system in the reverse order of power up: raise each individual probe,

raise the probe stage, remove the wafer, power down the field power supplies, power down the measurement equipment and light on the bench, and log out of the computer.

### Document Revision History

- Nov. 19, 1998 Dave Cuthbert ([dacut@ece.cmu.edu](mailto:dacut@ece.cmu.edu))  
 Initial version started. Still missing most sections.
- Nov. 29, 1998 Dave Cuthbert ([dacut@ece.cmu.edu](mailto:dacut@ece.cmu.edu))  
 Corrected description of the scan modes.  
 Fixed minor typographical errors.

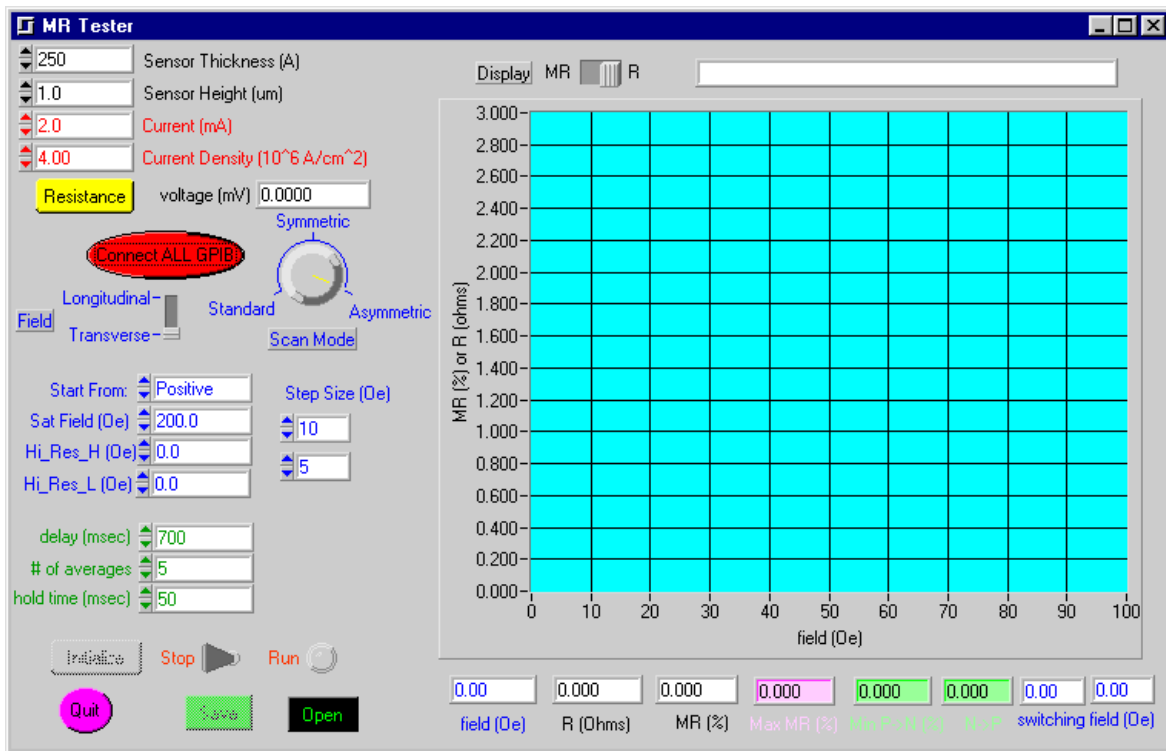


Figure 2: The MR prober software window.