Operating Procedure for BHL Model 107 M-H Loop Tracer[1]

WARNING: Pickup assemblies may be changed only when Run/Idle switch is on idle, or when loop tracer power is off. Attempting to change pickup assemblies while loop tracer is running will result in electric shock hazard for you and damaging power surges for the loop tracer. Handle pickup assemblies with care!

WARNING: Do not leave drive field on maximum for extended periods.

The function key F1 will abort the program.

Power Up (skip if the system is already powered up)

1. Turn on the computer, monitor, and printer. The switch for the computer and monitor are in the rear.
2. The BH Looper should already be on. If not, hold the power switch (upper row) in the on position until the oscilloscope and looper indicator lights are on.
3. When Windows 95 has finished loading, double-click on the "BH Looper" icon.
4. A menu will appear. The menu pointer may be moved by pressing the up and down arrows, and an item may be selected by pressing Enter. The window may be toggled between window and full screen display modes by pressing Alt+Enter.

Adjusting Trace and Sensitivity

1. Make sure the trace is present on oscilloscope. If no trace is seen, check:
    - Scope intensity control.
    - Run/Idle switch should be set to "Run."
    - Intensity controls on loop tracer should be turned up.
    - Field Mode switch should be set to "Normal."
    - Horizontal Drive control should be adjusted so that the trace covers the full range of the oscilloscope.
2. Set Horizontal Frequency know to 10 Hz.
3. If the trace is not flat or is badly distorted, adjust the black vertical Balance and Phase controls such that the trace is reasonably flat and not open. Turn the Field Mode switch to "Transverse" and repeat procedure using red vertical Balance and Phase controls. Place Field Mode know back to "Normal."
4. Using tweezers, place the magnetic sample into the teflon sample holder, and then place sample holder into the pickup assembly. **For consistency, always place samples in the holder with the film side facing down.**
5. Adjust the Vertical Sensitivity control such that the trace is neither too small nor off screen. Make sure that the drive is adjusted such that sample is saturated. If the trace is very distorted, remove the sample and readjust the black vertical Balance and Phase controls (see 3 above).
6. Rotate the sample to its hard axis. Adjust the Horizontal Sensitivity control such that the hard axis trace is fully saturated.
7. Remove the sample from the pickup assembly. Turn the Vertical Memory Select Switch to 'A'. Adjust the black vertical Balance and Phase controls such that the trace is level and not open. Toggle the Vertical Memory Store Switch to "Store." Turn the Field Mode switch to "Transverse" and repeat the procedure using the red vertical Balance and Phase controls. Then toggle the Vertical Memory Store Switch to "Store."
8. Decrease the Horizontal Drive control so that the trace occupies only the inner two divisions of the oscilloscope screen. Flip the Vertical Memory Select Switch to 'B'. Toggle the Vertical Memory Store Switch to "Store." Turn the Field Mode Switch to "Normal." Toggle the Vertical Memory Switch to Store. **Do not readjust the knobs during this step.**
9. Increase the Horizontal Drive back to full scale and return the Vertical Memory Select Switch to 'A'.
10. From this point on, the full scale trace should be flat with Memory 'A' selected and the two division trace should be flat with Memory 'B' selected.

Taking Data

Follow the instructions displayed on the monitor.

- Before taking data, the scope trace must be calibrated to full scale. The software will automatically prompt you to perform this adjustment. Following the instructions displayed on the monitor, turn the calibration knob to "Vert." Adjust the position and scale controls on the scope control until the two dots are exactly on the full

[1] Original source unknown; possibly SHB Instruments. Modifications made by Dave Cuthbert, August 27, 1998.

scale lines and press Enter. Turn the calibration knob to "Horiz" and repeat the procedure. Be sure to return calibration knob to Normal – the software does not prompt for this!

- When prompted for vertical and horizontal sensitivity, enter the readings from the respective loop tracer knobs. Units will be in nWb (vertical) and Oe (horizontal).
- Select desired measurement modes. To omit a measurement, press the right arrow key at a menu selection. Normally, you will want to use all four measurement modes.
- When measuring samples with coercivities greater than 0.1 Oe, set the frequency knob to 10 Hz. Otherwise, the sample should be measured at 2 Hz.
- Except for exchange-biased materials, the exchange field measurement will not be necessary.
- Place sample into the teflon sample holder, then place the sample holder into the pickup assembly.
- To make sure that the sample is exactly oriented on the easy or hard axis, turn the mode switch to Transverse and flatten and/or close the trace by rotating the sample. Once the trace is flattened, turn the Field Mode switch back to Normal and hit Enter. The computer will take data on ten traces and average them to compute the parameters.
- When measuring magnetostriction, the knives may be raised and lowered by turning the black knob on the right side of the pickup assembly (carefully).

Displaying and Plotting Data

- Parameters are automatically displayed when data acquisition is completed. Hit Enter to return to the main menu.
- To display the hysteresis loop on the screen select the "Draw Graph" menu option. If you wish to plot the data, select "Plot Graph."

Power Down Procedure

After you are finished taking measurements, be sure to

1. Reduce the drive field to its minimum setting.
2. Turn off the field by flipping the Run/Idle switch to "Idle."
3. Turn the oscilloscope intensity to the minimum.
4. Turn off the computer: click on the Start button in the lower left corner and select Shutdown; turn off the power when the "It is now safe to turn off your computer" message appears.
5. **Do not turn off the BH Looper.**