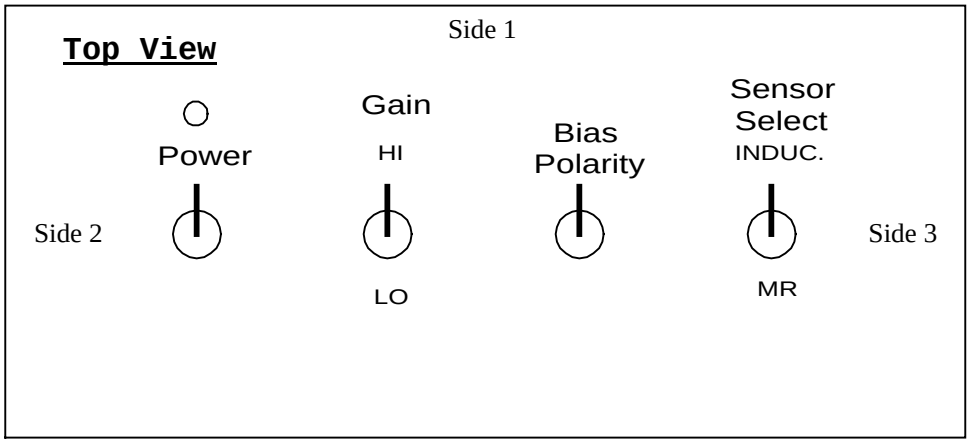
1. Using the Read-Sensor Device

1.1. Functionality

This device is meant to demonstrate the difference between an inductive read head and a MR (magneto-resistive) read head. By making a comparison between the two, one can see the differences between the physical characteristics of the two types of data-reading devices. The comparison is made using two different types of sensors, similar to the reading-head in a tape/disk media device.

1.2. Controls and Interface



One can see from above the control unit for the device. Use these switches to operate the device as described below.

1.2.1. Power- Switch ON/OFF power for the device.

1.2.2. Gain- Change the gain of the signal from a high (large) state to a low (small) state. Start with the gain set to the LO position.

1.2.3. Bias Polarity- Change the polarity of the biasing magnetic field for the MR sensor by changing the position of the switch.

1.2.4. Sensor Select- Specify which sensor will be active and show its waveform on the screen of the scope.

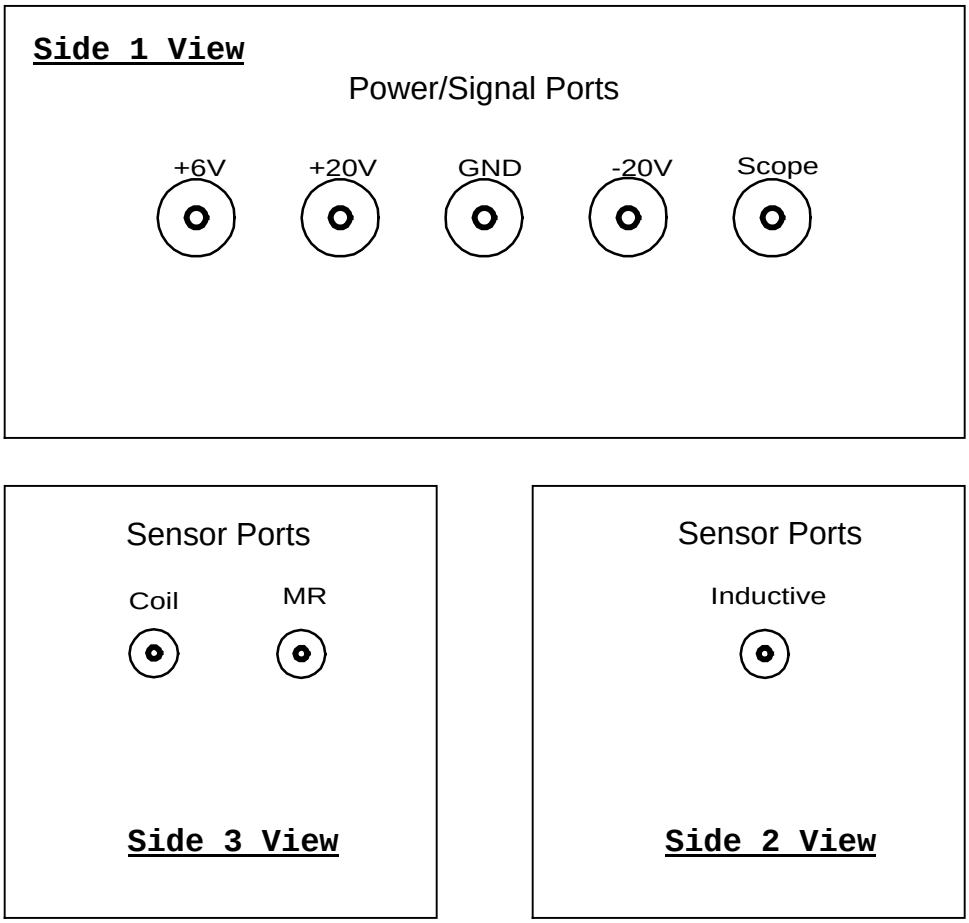
1.3. Connection and Setup

The connection of the device has three parts as follows (Use the diagram below for visual assistance):

1.3.1. Power Connections: Make sure that all of the voltages on the supply are set to zero. Connect the power ports on Side 1 of the device to the corresponding ports on the power supply. When you are certain connections are made correctly, turn the +/-20V side of the supply to +/-5V, and leave the +6V side to 0V.

1.3.2. Scope Connection: Connect the port on Side 1 of the device labeled "Scope" to channel 1 of the scope.

1.3.3. Sensor Connection: *****WARNING:** Make sure that your station is "static free" by being protected by a grounded static free pad, and the user is grounded with a static free strap connected to his/her wrist. The MR sensor is static sensitive and must be protected. *** Connect the inductive and MR sensors to the device as per the diagram below. Note that the inductive sensor gets connected on Side 2 of the device, and the MR sensor gets connected on Side 3 of the device. Note also that the MR sensor has a connection labeled "Coil" which supplies current to generate the biasing magnetic field on the MR sensor.



1.4. Making Measurements with the Inductive Sensor

Follow the instructions below to make measurements with the inductive sensor.

1.4.1. Turn on the scope and set it into the "Roll" mode by pressing the "Main/Delayed" key and then selecting the roll mode by pressing the "Roll" softkey.

1.4.2. Turn the vectors "ON" by pressing the "Display" hardkey and then the "Vectors" softkey until the appropriate option is highlighted. Turn on the band-width limiter by pressing the Channel "1" hardkey, and the pressing the "BW Lim" softkey until the appropriate option is highlighted.

1.4.3. Set the time/division to 200ms/div. Set the Volts/div to 200mV.

1.4.4. Set the sensor select on the device to "INDUC." Make sure that it is connected and then pass the device over the magnetic media supplied by your TA, in the correct direction as explained by your TA. The magnetic transition implanted on the magnetic media should be displayed on the scope, rolling progressively from the right to the left. The average voltage output of the sensor with no magnetic excitation is 0V.

1.4.5. To capture waveforms to the computer, follow the instructions given in the OIS for the computer interface, such as was done with the tape device. Use the RUN/STOP buttons on the Storage section of the scope to stop the waveform in its roll across the screen if necessary.

1.5. Making Measurements with the Magneto-resistive Sensor

Follow the instructions below to make measurements with the magneto-resistive sensor.

1.5.1. Turn on the scope and set it into the "Roll" mode by pressing the "Main/Delayed" key and then selecting the roll mode by pressing the "Roll" softkey.

1.5.2. Turn the vectors "ON" by pressing the "Display" hardkey and then the "Vectors" softkey until the appropriate option is highlighted. Turn on the band-width limiter by pressing the Channel "1" hardkey, and the pressing the "BW Lim" softkey until the appropriate option is highlighted.

1.5.3. Set the time/division to 200ms/div. Set the Volts/div to 200mV.

1.5.4. Set the sensor select on the device to "MR" Make sure that it is connected and then pass the device over the magnetic media supplied by your TA, in the correct direction as explained by your TA. The magnetic transition implanted on the magnetic media should be displayed on the scope, rolling progressively from the right to the left. The average voltage output of the sensor without any magnetic excitation is 1.5V (no bias).

1.5.5. TO ADJUST THE BIASING FIELD: To adjust the biasing field of the sensor, adjust the +6V side of the power supply from 0V to 6V to obtain the desired amount of bias. The circuit is purely resistive, so the magnitude of the applied bias field is directly proportional to the voltage selected on the power supply. One can observe the waveform move from a minimum readback value around 1.5V to a maximum (saturated) readback value of around 3.0V.

1.5.6. To capture waveforms to the computer, follow the instructions given in the OIS for the computer interface, such as was done with the tape device. Use the RUN/STOP buttons on the Storage section of the scope to stop the waveform in its roll across the screen if necessary.