INSTRUCTIONS:THE TRIFIELD® NATURAL EM METER

To use the meter, turn the knob to Battery Test. The needle should be on or to the right of the diagonal line which is itself to the right of the words "Batt Test" on the meter scale. If the needle reads left of that line, replace by unscrewing the four back screws. A regular 9 volt battery will last for about 10 hours of testing; an alkaline will last for 50.

On MAGNETIC, the meter reads any change in the magnetic field caused by rotating the meter in the Earth's magnetic field, by a moving magnetic object, or by DC currents carried by wires or the atmosphere. The Earth's field strength is about 50 microteslas (500 milliguass), so rotating the meter from north to south rapidly (within a 0.5 second interval) causes a momentary reading of about 100 (a change from -50 to +50). If subsequently held still, the needle will settle back to zero. For the best readings of transient fields, the meter should be placed on a stationary platform because of sensitivity to slight rotations while hand-held.

Though the body produces very little magnetic field, the electric field is strong enough to be measured. Turn the knob to ELECTRIC and multiply the reading by 10 to get units of V/m; thus a momentary needle peak at full scale means the field changed by 1000 V/m. During a thunderstorm, the electric field will fluctuate indoors by as much as 100 V/m. At other times, the fluctuation is less than 3 V/m, so that indoor transient phenomena are easier to detect during calm weather. Set the meter upright on a stationary metal surface for greatest sensitivity.

On SUM, the meter will add any changes in the electric field to any changes in the magnetic field, so that if either field increases or decreases, the needle will rise above zero.

RADIO/MICROWAVE directly reads radio waves from 100 KHz to 3 GHz, and can detect fairly weak localized radio sources if you hold the top of the meter close to the source. In most areas this always reads zero. It can also check a microwave oven for leakage. If you turn the oven on and stand six feet away, the meter should read less than half scale, or 0.2 milliwatts per square centimeter, for a properly functioning oven. If it reads higher than 0.2, have the door seal repaired.

The side knob controls the tone threshold. The tone sounds only if the needle deflection is sufficiently high. The tone won't sound at all if the knob is turned all the way counterclockwise.

The Natural EM Meter

The TriField[R] Natural EM Meter detects changes in extremely weak static (DC or "natural") electric and magnetic fields. It signals with both a tone and the movement of a needle-type gauge if either the electric or magnetic field changes from previous levels. A radio and microwave detector is also included, which reads radio power directly if any transmitters are nearby. Because man-made AC electric and magnetic fields are very common and could interfere with readings of static fields, the meter has been designed to ignore the AC fields of power lines, appliances, etc.

This meter was designed to do field measurements for special research. It can detect geomagnetic storms caused by unusual solar activity interacting with the ionosphere (which results in rapid changes of up to 10% in the Earth's magnetic field), as well as the electrical activity of ordinary thunderstorms. Ball lightning should in theory be associated with a strong magnetic field, and magnetization of metal on the ground has been reported with some sightings of unusual lights in the sky. When set on MAGNETIC, the Natural EM Meter will signal the movement of any distant, strong magnetic sources in the sky, even if the sky is cloudy or the source dips behind a hill. Because house construction materials generally do not block magnetic fields, the meter can be placed indoors and will work equally well. Because of the built-in tone, it can be used in the dark, and will sound the tone at whatever level of field the user sets.

The meter is sensitive to changes of as little as 0.5% of the strength of the Earth's magnetic field, and the tone will sound whether the field increases or decreases. After the meter detects an event, when the magnetic field then becomes stable for more than about five seconds, the tone will stop and the needle will return to zero. The meter will remain at rest until the field changes again. The threshold level (squelch level) of the tone is adjustable. The user determines the amount of change in the magnetic field required to sound the tone. If the field changes by the threshold amount, the tone will come on at a low pitch. If the amount of change is larger, the tone's pitch will be higher. This meter can also be used to determine if anything is magnetized. For example, if a bed frame is magnetized, the meter can be held vertically and slowly be swept by hand over the bed. Any changes in the direction or strength of the magnetic field will register. A similar process can reveal the presence of magnetic rocks just below the ground.

When the dial is set to ELECTRIC, the meter is sensitive to electric fields as weak as 3 V/m (volts per meter). To illustrate just how feeble a field this is, a 10'x10'x10' room filled with a field of this strength has a total amount of energy equivalent to that required to lift a single grain of table salt 1/50th of an inch. Indoors, electric fields typically fluctuate 1 or 2 V/m. By setting the minimum sensitivity to change at 3 V/m, we have designed the meter to disregard this "background noise". Human beings and animals usually emit an electric field which is easily detectable using the Natural EM Meter. In fact, the meter can be used as a motion-activated intruder alarm. It

is so sensitive that it can detect the presence of a person through a wall. Though it is not foolproof in this capacity, (sometimes a person will carry no electric charge and thus be "invisible" to the meter), its sensitivity is of interest to researchers in the field of parapsychology. Every type of detectable physical manifestation ("Type of Effect or Field" in the table below) requires a certain amount of energy. For example, "moving air" requires the expenditure of a small amount of energy to get the air to move initially. Below is a table showing several types of effects or fields emitted by people and objects. It also shows the minimum amount of energy required (per cubic foot of air) to set up that effect or field so that it is stronger than typical indoor "background noise" for that effect or field. Clearly the static electric field is the type that requires the least energy to be detectable.

Type of Effect or Field	Energy Needed (watt-seconds)	Emitted by People?	Are Instruments Needed to Detect this?
Heat	30	yes	thermal viewer
Moving air	1/10,000	yes	no (can feel this)
Static magnetic	1/20 million	no	magnetic meter
Sound	1/100 million	yes	no
Light	1/billion	no	no
Static electric	1/10 billion	yes	electric meter

The radio/microwave detector is sensitive from 100,000 to 2.5 billion oscillations per second (100 KHz to 2.5 GHz) and can detect strong or unusual atmospheric electrical activity. It can also detect leaky microwave ovens, cellular or portable phones, walkie-talkies and concealed surveillance bugs. Its minimum and maximum detectable signal strengths are .01 milliwatt/cm^2 and 1- milliwatt/cm^2 respectively. The SUM setting adds together the electric and magnetic fields and detects if either field changes. The Natural EM Meter is used to find a disturbance in either type of field, but in the SUM setting it can generally detect if a person approaches to within 5-10 feet, even on the other side of a wall. For this reason, the Natural EM Meter is preferred for para-psycho-logical research, when for example, a room to be measured is known to be vacant for an extended period (except for experimenters, who remain relatively still for that period).

The Natural EM Meter operates on a standard replaceable 9 volt battery (included), and is covered by a one-year warranty.

Natural EM Meter
Frequency Response Table

Frequency (Hz)	Magnetic Full Scale Equals (RMS milligauss)	Multiply Reading By	Electric Full Scale Equals (RMS Volts/Meter)	Multiply Reading By
.5	330	3.3	2,000	20
1	580	5.8	2,000	20
2	1,000	10	2,300	23
5	1,500	15	2,500	25
10	2,500	25	2,800	28
20	3,000	30	5,000	50
50	3,300	33	16,000	160
100	3,500	35	50,000	500
200	3,500	35		
500	3,300	33		
1,000	3,000	30		
2,000	2,300	23		
5,000	2,000	20		
10,000	2,500			

*Minimum resolution is 1/200 of full scale.

Note on magnetic measurements:

When measuring variations in magnetic field along a path (that is, walking with the meter to detect magnetic rocks under the ground, etc.), try to align the direction of *the magnetic* sensor (or long axis of the Natural EM Meter) along the magnetic North-South line. This is the direction which produces the least amount of unwanted signal as you walk. If the magnetic sensor is pointed along magnetic North-South (and it doesn't matter whether the top is pointed North or South), the meter is not sensitive to accidental reorientation by, for example, 5° of arc. But if the sensor is instead pointed East-West, a direction change of 5° will produce a large signal. As you walk, the direction of the meter will normally "jitter" by about 5°. If held carefully *along* the magnetic North-South axis, any signal detected as you walk along will come only from true variations in the magnetic field. The direction of magnetic North-South depends on where you are in the world. In North America, for example, the magnetic North is 40° to 90° below the horizon. In Asia, it is horizontal, and almost along true North-South. In Europe, it is slightly below the horizon and slightly west of true North. In Australia-New Zealand, magnetic North is about 45° above the horizon. To find magnetic North, point the top (or bottom) of the meter (or sensor) toward approximate magnetic North (in North America, point the the top North, then rotate downward about 45°). From this starting orientation, find the direction in which the meter (on MAGNETIC) is least sensitive to slight reorientation. This is the magnetic North-South axis.