PQTN
Power Quality Testing Network

APPLICATION

Computer Users
Computer Monitors
Magnetic-Field Interference

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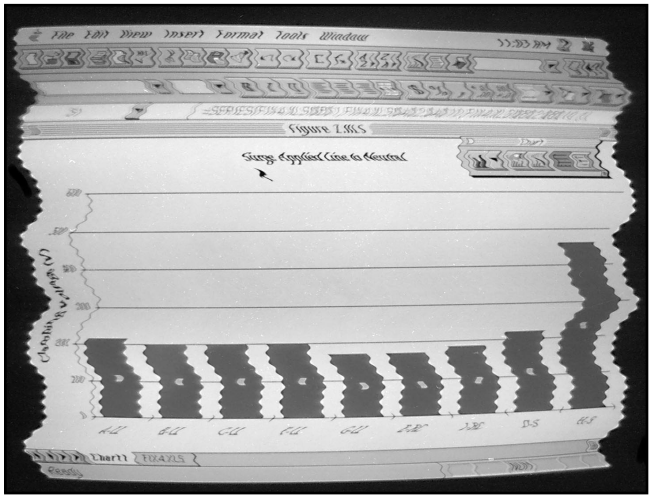
Eliminating the Jitters in Computer Monitors

Application

Millions of computer users spend hours gazing at computer monitors as part of their work routines. A jittering computer screen is not only difficult to use but can also severely irritate the user, and can even cause eye strain and nausea with prolonged use. This PQTN Application provides suggestions for eliminating the jitters in computer monitors.

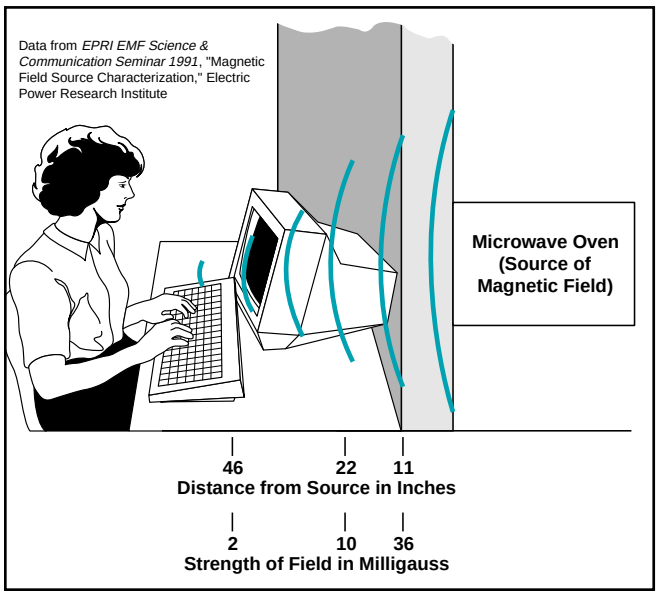


Jittering Video Monitor Caused by an Electric Fan Held Close to the Monitor (Extreme Case for Illustration)

What To Look For

Wavy lines and jittering screens in a computer monitor are classic symptoms of a magnetic field interfering with the magnetics of a picture tube. Because magnetic fields decay with the square of the distance from the source, the source of an interfering magnetic field will probably be very close to the monitor. Measured in units of milligauss, magnetic fields are created any time electric current flows through an appliance or wire. Generally, a magnetic field must be greater than eight milligauss to cause a monitor to jitter, depending upon the size of the monitor. The larger the monitor (measured in diagonal inches of the screen), the more susceptible it is to magnetic fields. Among the common appliances that cause magnetic fields are laser printers, photocopiers, fans, refrigerators, electric stoves, microwave ovens, air conditioners, and electric heaters. Magnetic fields caused by building transformers, circuit-breaker panels, electrical switchboards, some uninterruptible power supplies (UPSs), and concentrations of magnetic ballasts can also cause jittering.

Overhead or underground wires carrying large currents can produce magnetic fields. However, properly installed building wiring should not generate significant magnetic fields because the fields generated by the neutral and hot wires, which are routed together, cancel out each other. Significant magnetic fields can be caused by current flowing "unopposed" in building wiring and conduit. Such "stray currents" are usually caused by wiring errors such as improper grounding, bonded or reversed neutral and ground conductors in circuit-breaker panels or in electrical outlets, or individual circuit conductors that are not routed with other conductors—all of which are violations of the National Electrical Code. Moreover, these stray currents can flow or be coupled



The strength of a magnetic field decreases rapidly as the distance from the source increases. In this case, moving the monitor another two feet away from the source will eliminate the jitters caused by the microwave oven on the other side of the dividing wall.

into steel beams and air-conditioning ducts, thus spreading magnetic fields throughout a building.

HOW TO ELIMINATE THE JITTERS

First, make sure that the computer and its monitor are properly grounded and not located near transformers, copy machines, UPSs, or circuit-breaker panels. To locate the source of an interfering magnetic field, turn off lights and other appliances one at a time to see if the jitter goes away. Also look for circuit-breaker panels and transformers behind walls adjacent to the monitor. If the source of the magnetic field can be identified this way, try moving either the source or the monitor. In some cases, simply changing the orientation of the monitor will mitigate the jitters. Any source that poses a danger, such as overheated transformers or improperly wired electrical outlets, should be immediately serviced by a licensed electrician. If the lighting is identified as the source, you are likely to have magnetic ballasts. In this case, replacing magnetic ballasts with electronic ballasts will probably reduce the magnetic fields and eliminate the jitters.

If the monitor or source of the magnetic field cannot be easily moved, the scan rate (also called refresh rate) of standard VGA monitors connected to IBM-compatible computers can be reset to a different frequency by using a program called SETVSCAN. The closer the scan rate is set to 60 hertz, the less the monitor will jitter in the presence of a 60-hertz magnetic field. SETVSCAN can be used for all DOS-shell programs. However, most Windows® programs usually run at 59.9 Hz, so those programs should not be affected by magnetic fields. For DOS-shell programs called up by Windows® that are affected by magnetic fields, executing SETVSCAN before opening Windows® should work. You can also reset the scan rate by reconfiguring the video card, which requires consultation with the monitor manufacturer.

If the monitor scan rate cannot be adjusted or the source of the magnetic field cannot be reliably located, you can rent a hand-held gaussmeter from an equipment rental company to locate the source. If the meter indicates that the field is coming from a steel structure, air-conditioning ducts, or other large metal conductors, have a licensed electrician check the building wiring for wiring errors such as separated runs of neutral and hot wires or reversed wires in circuit-breaker panels and electrical outlets. If you identify the utility service entrance, utility-owned equipment, or a neighboring structure as a source of an interfering magnetic field, consult your local utility. As a last resort, magnetic shields with special metal alloys can be used to screen the monitor from magnetic fields. However, these shields are expensive and can be unsightly.

Quick Check List

- ❑ Ensure that the computer and monitor are properly grounded and away from large electrical equipment, panels, and transformers.
- ❑ To locate the source of magnetic fields, turn off lights and appliances one at a time or use a hand-held gaussmeter.
- ❑ Move the monitor or the source of the field.
- ❑ Check the building wiring. Bonded or reversed neutral and ground conductors in circuit-breaker panels or in electrical outlets and runs of separated neutral wires should be repaired by a licensed electrician.
- ❑ Change the scan rate of IBM-compatible computers by using SETVSCAN or by reconfiguring the video card.

BENEFITS

- Reduce eye strain and irritation by eliminating computer monitor jitters.
- Increase safety and equipment performance by identifying and repairing faulty wiring and grounding.

WHERE TO FIND HELP

- Your local computer service center
- Your local electric utility

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