



# Tech Info Library

## Using U.S. Apple Equipment Internationally (10/96)

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TOPIC -----

This article contains information on using U.S. Apple products outside the United States.

In the following context, using a product "internationally" means using it in a country with electrical power different from that of the country of manufacture. In determining whether a particular product can be used internationally, there are three classes, depending on whether a product accepts a range in voltage, frequency or both:

### 1) Universal

These products can be used internationally out of the box. Some of Apple's products are self-configuring devices or "universal" within a certain range. They can accept a range in both voltage and frequency, and only require a plug adapter for the specific locale.

Example: The Quadra 800 accepts 100-240 volts, 47-63 Hz.

### 2) Frequency Independent

These products can be used internationally with a voltage transformer. Generally they are geared for U.S. 120 volt power, but are flexible as to the frequency they accept (for example, 47-63 Hz), and are known as "frequency independent." These products need a stepdown isolation transformer to adapt the voltage, and will handle the different frequency on their own.

Examples:

The U.S. Performa 200 accepts 120 volts, 47-63 Hz.

Performa Displays use a switching power supply which works independent of the input frequency. The European input frequency standard of 50 hz will not adversely affect these monitors. You can use the Performa Displays overseas with a voltage converter (isolation transformer.)

### 3) Frequency Dependent

These products generally cannot be used internationally. These are products that can work only within a narrow range in frequency; they are "frequency dependent." Transformers only transform voltage, so if

the product requires a certain frequency, there's no practical way to convert both voltage and frequency.

These products can ONLY be used internationally in countries with the same frequency as the country for which the product was manufactured. Further, a voltage transformer will be required if the destination country has a voltage different from the home country.

Example:

The U.S. Apple Color OneScanner accepts 108-132 volts, 58-62 Hz.

**\*\*IMPORTANT NOTE\*\*** Computers with power outlets for peripherals do not condition the voltage as it passes through. So, for example, a monitor requiring 120v-60Hz power could not be used in a 220v-50Hz environment even if the computer from which it gets its power is able to accept the local power.

This article also includes transportation, service, repair, and warranty tips.

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- 1) Universal Devices
- 2) Voltage-dependent Devices
- 3) Frequency-dependent Devices
- 4) Service and Repair Tips
- 5) Traveling Tips

## DISCUSSION -----

This article provides general information on using products outside the United States. If you want to find the electrical specifications of any specific piece of Apple hardware, refer to the Tech Info Library articles:

Electrical Specifications: Apple Computers (1 of 2)    TECHINFO-0000267  
Electrical Specifications: Apple Peripherals (2 of 2) TECHINFO-0020361

### 1) UNIVERSAL DEVICES

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The majority of Apple products manufactured after the Macintosh SE are self-configuring or "universal" between 100v and 240v, 50-60Hz. To use them in countries within the range, a plug adapter should be all that is needed. Note that some Apple products have a voltage selector to select between 110 or 220 volts.

To verify if a specific product is universal, check the FCC ID label for the voltage requirements or the previously mentioned Electrical Specifications articles.

### 2) VOLTAGE-DEPENDENT DEVICES

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The Apple products designed to operate at a line voltage ranging from 107V to

137V at 50 or 60Hz (cycles per second) are considered to be voltage-dependant. If the destination country uses a line voltage of 220v, and the product only accepts 120v, you'll need a 220v to 110v stepdown isolation transformer. This type of transformer is the only one known to give a clean signal. Although converters are available in the U.S., there are reports that these devices have damaged some Apple products.

The transformer's wattage should be 150% of the total wattage of the system (computer, monitor, hard disk, printer, and so on). For example, if the system pulls 250 watts of power, use a transformer rated for a minimum of 375 watts. A 500-watt unit should be sufficient for an entire Apple system (CPU, monitor, and printer). The unit must have a third prong for a grounded outlet. Electrical shock to you or damage to the hardware may occur if the units are not grounded.

Non-universal Apple power supplies function correctly with voltages between 107V and 132V. If line voltage fluctuates outside these specifications, you'll need to use a power conditioner to ensure uninterrupted operation of your Apple equipment. Operating without the conditioner will probably not result in damage to the hardware, although the voltage fluctuation may cause your system to crash. In such an event, you'll lose any data in memory and may even lose data stored on the disk.

### 3) FREQUENCY-DEPENDENT DEVICES

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If the country uses a line frequency other than 60Hz, then all AC-powered devices attached to your computer system (monitors, printers, plotters, hard disks, and so on) must be "frequency independent." That is, they must be able to operate on a line frequency of either 50 and 60Hz. A majority of Apple products are frequency independent, but check the specifications of all equipment prior to using them.

### 4) SERVICE AND REPAIR TIPS

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As of April 5, 1993, an Apple warranty is valid in any country in which Apple sells products. A defective unit may be returned to any Authorized Apple Service Provider worldwide for service under warranty.

There are advantages to buying the products where they'll be used. Although mouse devices, external drives, digital boards, and similar modules are the same as distributed in the U.S., the software and keyboards are different for each country. Further, having the entire workstation dependent on a single transformer is risky. If it fails and passes native current through to voltage and/or frequency dependent products, serious damage will result.

If you intend to take your Apple product with you, it is advisable that you buy and use the product well before your departure. Heavy use often turns up any problems that would have come up at more inconvenient times while traveling.

### 5) TRAVELING TIPS

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When traveling with a computer in the U.S. or overseas, protect it from shock, heat, moisture, radiation, and theft. Special hard-shell shipping cases are advertised for most Apple systems and these protect the machines from environmental abuse. They often do not look like computer cases, and as such usually escape the notice of thieves.

X-rays and other magnetic radiation associated with X-ray machines only pose a slight potential danger; there have been no reports of ROM damage and only isolated reports of software media damage from these causes. Some airports X-ray all luggage; if the risk in losing software is too high, plan your travel logistics after you find out which airports will hand-check the computer.

Due to concern about computers and floppy disks going through security scanners at airports, the American Society for Testing and Materials (ASTM) conducted a study on X-ray induced damage to memory devices, including audio and video tapes and floppy disks, and found that the devices usually have enough shielding to protect the media.

The study found that the magnetic field was actually strongest around the scanner's monitor. They taped a disk to the monitor for several hours without damage. A committee member suggested that it would take at least 1000 million passes through the machine before any damage would be evident.

Article Change History:

- 10 Oct 1996 - Updated with additional TIL articles.
- 21 Mar 1996 - Added results from and information about ASTM testing study.
- 03 Jan 1995 - Reviewed for technical accuracy, revised formatting.

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