

# ELECTRONICS AND TRAVEL

**A Note of Caution:** Lewis N. Clark converters and transformers are designed to operate with small personal appliances for short periods of time. They should never be used continuously, and never used with medical or industrial equipment.

North American electrical appliances are designed to operate using 110 – 125 volts AC (Alternating Current), while appliances in most other countries operate using 220 – 250 volts AC. Additionally, the shape of electrical outlets differs throughout the world. If you are traveling with an electrical appliance, it is likely you will need an adapter, converter, or transformer, depending on the appliances you take. This page has been prepared as a general guide to help explain electrical requirements around the world.

*Note to Canadian consumers: Product offerings may be slightly different in your market. Please check with your local retailer for details.*

## Cycles (50Hz or 60Hz)

Electric current alternates direction (AC) at 60Hz (cycles per second) in North America, but at a slower 50Hz in many other parts of the world. There are even some areas with a direct current (DC), which does not alternate at all. However, converters and transformers are designed to operate in AC areas ONLY.

The difference in cycles may cause your North American appliance to operate slightly slower when used at 50Hz. This cycle difference can also cause analog clocks and timing devices to keep incorrect time. Most modern electronic equipment such as battery chargers, computers and CD players will not be affected by the difference in cycles. However, because converters and transformers will not adjust cycles, it is very important to check each product's specifications and requirements before using them, or to contact the manufacturer if in doubt.

## Voltage and Wattage

You must also determine the voltage and wattage ratings of your appliances in order to select the appropriate converter, transformer and/or adapter plug required. This information is usually listed on the appliance manufacturer's label located on the back or bottom of the appliance, or in the product specifications section of the instruction manual. The label or manual will show the following items: voltage, wattage, or amperage. If only the amperage rating is shown, simply multiply the voltage by the amperage to find the appliance's wattage rating. Volts x Amps = Watts (i.e. 120V x .5A = 60W)

NOTE: If your appliance is dual-voltage (120/240V), it will NOT require a converter or transformer for use overseas, although you may need an adapter plug.

## Electric vs. Electronic

It is critical to know if the appliances you intend to use are electric or electronic. This will determine if you need a converter, transformer, or in some instances, both. Electric appliances operate with simple heating elements or motors (hot pots, travel irons, hair dryers, heating pads, etc.). These appliances may be used with either a converter or a transformer of the appropriate wattage range for short periods of time, less than 1 hour.

Electronic appliances operate with electronic motors, circuits or chips (computers, clocks, radios, battery chargers, appliances equipped with timers or automatic shut-off devices). These appliances should be used ONLY with a transformer of the appropriate wattage range for short periods of time of less than three hours.

NOTE: Computers are typically dual-voltage and do not usually require a transformer, but always check the manufacturer's specifications first.

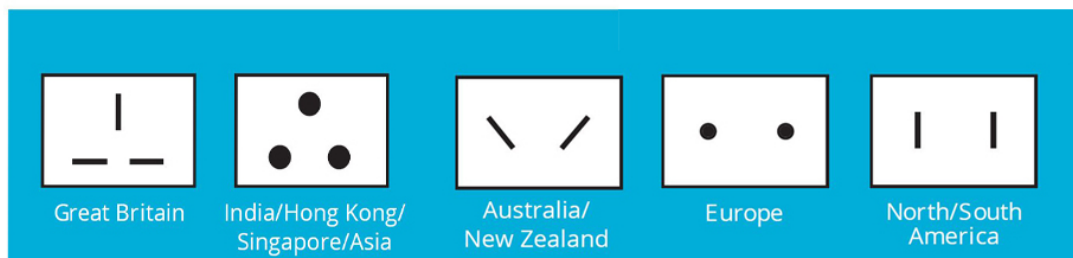
## European Shaver Sockets

IMPORTANT: The 220-240VAC electrical outlets found in the bathrooms of many foreign countries are designed for use ONLY with low wattage appliances rated 5–10 watts maximum, such as electric shavers, contact lens disinfectors, etc. Using a hair dryer or other high wattage appliance on this outlet can blow the circuit breaker and may damage both the converter and appliance.

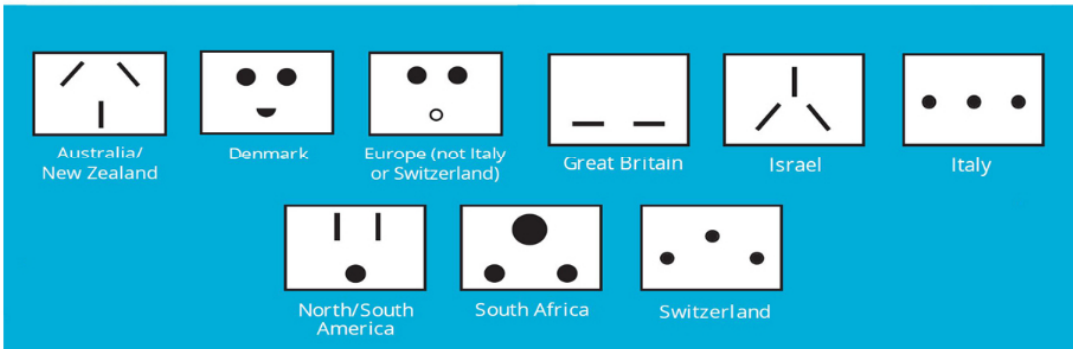


## COMMON WALL OUTLETS THROUGHOUT THE WORLD:

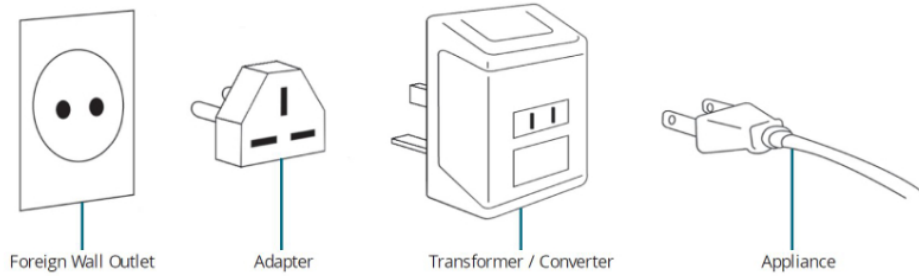
### Standard Outlets



### Grounded Outlets



## PROPER CONNECTION OF ADAPTERS AND TRANSFORMERS



### Adapter Plugs

Adapter plugs do not convert electricity. They simply allow an appliance plug to fit into an outlet with a different plug configuration. Adapter plugs may be used with converters, transformers or dual-voltage appliances. Please refer to the Voltage Chart below for a detailed list of the most commonly used adapter types throughout the world.

Lewis N. Clark offers three types of adapter plugs:

**Standard (E105, E106, E107, E108, EK58):** These adapters are the most commonly used configurations throughout the world, and can accept 2-pin round or flat blades.

**Universal (EK129, VF6, VR8):** These adapters feature a universal receptacle that accepts any appliance's plug configuration. Also available as an all-in-one design (EK129) with four plug configurations for worldwide use.

**Grounded (VG3, VG10, VG12):** These adapters are country specific, feature a universal receptacle, and are also grounded for use with grounded appliances.

# WORLDWIDE VOLTAGE



**A**  
(E108)



**B**  
(E106)



**C**  
(E107)



**D**  
(E105)

COUNTRY	ADAPTER	VOLTAGE	HZ
Albania	B	220	50
Algeria	B	127/220	50
American Samoa	A,B,C	120/220	60
Angola	B	220	50
Anguilla	D	240	50
Antigua/Barbuda	A,D	30	60
Argentina	B,C	220	50
Armenia	B	220	50
Aruba	A,B,C	115	60
Australia	C	240	50
Austria	B	230	50

COUNTRY	ADAPTER	VOLTAGE	HZ
Kenya	B,D	240	50
Kirghizia	B	220	50
Korea	A,B	110/220	50/60
Kuwait	B,D	240	50
Laos	A,B	220	50
Latvia	B	220	50
Lebanon	B	220	50
Lesotho	B	240	50
Liberia	A,D	120	60
Libya	B	230	50
Lithuania	B	220	50

Azores	B	220	50
Bahamas	A	120	60
Bahrain	D	220	50
Bali	B	220	50
Bangladesh	B	220	50
Barbados	A	115	50
Belarus	B	220	50
Belgium	B	230	50
Belize	A	110	60
Bermuda	A	120	60
Bhutan	B,D	220	50
Bolivia	A,B	110/220	50
Bosnia-Herzegovina	B	220	50
Botswana	D	220	50
Brazil	A,B	10/220	60
Bulgaria	B	220	50
Burkina	B	220	50
Burma(Myanmar)	D	230	50
Burundi	B	220	50
Cambodia	A,B	120/220	50
Cameroon	B	220	50
Canada	A	120	60
Canary Islands	B	220	50
Cape Verde Islands	B	220	50
Cayman Islands	A	120	60
Central African Republic	B	220	50
Chad	B	220	50
Chile	B	220	50
China	B,C	220	50
Colombia	A	110	60
Comoros	B	220	50
Congo	B	220	50
Costa Rica	A	120	60
Croatia	B	220	50
Cuba	A	120	60
Curacao	A,B	110/220	60
Cyprus	B,D	240	50
Czech Republic	B	220	50

Macao	B	220	50
Macedonia	B	220	50
Madagascar	B	220	50
Malawi	D	230	50
Malaysia	D	240	50
Mali	B	220	50
Malta	D	240	50
Martinique	B	220	50
Mauritania	B	220	50
Mauritius	B, D	230	50
Mexico	A	120	60
Moldova	B	220	50
Monaco	B	220	50
Mongolia	B	220	50
Morocco	B	220	50
Mozambique	B	220	50
Myanmar (Burma)	D	230	50
Nepal	B	220	50
Netherlands	B	230	50
New Zealand	C	230	50
Nicaragua	A	120	60
Niger	B	220	50
Nigeria	D	230	50
Norway	B	230	50
Oman	D	240	50
Pakistan	B	230	50
Panama	A	120	60
Papua New Guinea	C	240	50
Paraguay	B	220	50
Peru	A, B	110/220	50/60
Philippines	A, B	110/220	60
Poland	B	220	50
Portugal	B	230	50
Puerto Rico	A	120	60
Qatar	D	240	50
Romania	B	220	50
Russian Federation	B	220	50
Rwanda	B	220	50

Denmark	B	30	50
Djibouti	B	220	50
Dominica	B,D	230	50
Dominican Republic	A	110	60
Ecuador	A	120	60
Egypt	B	220	50
El Salvador	A	115	60
England	D	240	50
Eritrea	B	220	50
Estonia	B	220	50
Ethiopia	B	220	50
Fiji	C	240	50
Finland	B	230	50
France	B	230	50
Gabon	B	220	50
Gambia	D	220	50
Georgia	B	220	50
Germany	B	230	50
Ghana	B,D	220	50
Greece	B	230	50
Greenland	B	220	50
Grenada	B,D	230	50
Grenadines	B,D	230	50
Guadeloupe	B	220	50
Guam	A	120	60
Guatemala	A	120	60
Guinea	B	220	50
Guyana	A	110	60
Haiti	A	110	60
Honduras	A	110	60
Hong Kong	D	220	50
Hungary	B	220	50
Iceland	B	220	50
India	B	220	50
Indonesia	B	220	50
Iran	B	220	50
Iraq	B,D	220	50
Ireland	D	220	50
Israel	B	230	50

St. Kitts-Nevis	D	230	60
St. Lucia	D	240	50
St. Vincent	D	230	50
Saudi Arabia	A, B, D	127/220	50/60
Scotland	D	220	50
Senegal	B	220	50
Seychelles	D	240	50
Sierra Leone	D	230	50
Singapore	B, D	230	50
Slovakia	B	220	50
Slovenia	B	220	50
Solomon Islands	C, D	220	50
Somalia	B	220	50
Spain	B	230	50
Sudan	B, D	240	50
Surinam	A, B	110/220	50/60
Sweden	B	230	50
Switzerland	B	230	50
Syria	B	220	50
Tahiti	A, B	127/220	50/60
Taiwan	A	110	60
Tajikistan	B	220	50
Tanzania	D	230	50
Thailand	A, B	220	50
Tonga	A, C	110/220	50/60
Trinidad & Tobago	A, D	115/230	60
Tunisia	B	220	50
Turkey	B	220	50
Turkmenistan	B	220	50
Uganda	D	240	50
Ukraine	B	220	50
United Arab Emirates	D	220	50
United States	A	120	60
Uruguay	B	220	50
Uzbekistan	B	220	50
Venezuela	A	120	60
Vietnam	A, B	120/220	50
Virgin Islands	A	120	60
Wales	D	220	50

Italy	B	230	50
Ivory Coast	B	220	50
Jamaica	A	110	50
Japan	A	100	50/60
Jordan	B,D	220	50
Kazakhstan	B	220	50

Western Samoa	C	230	50
Yemen	B, D	220	50
Yugoslavia	B	220	50
Zaire	B	220	50
Zambia	B, D	220	50
Zimbabwe	D	220	50

### Converters

Converters are for use with single volt Electric appliances ONLY, and should NEVER be used with Electronic or Dual-Voltage appliances. Converters should be used for short periods of time of less than one hour.

Lewis N. Clark offers Dual Wattage converters for use in countries operating on 220V:

*Dual Wattage (E111)*: Operates as a transformer on the low setting for use with 110V electric or electronic appliances rated 0–50 watts. Operates as a converter on the high setting for use with 110V electric appliances ONLY rated 50–2000 watts. Also sold as a kit (EK121) including four international adapter plugs.

### CONVERTER/ TRANSFORMER TABLE

This table is a general guide to appliances commonly used during travel. It is only a guide.

It is possible that your appliances and other items listed below have different wattage specifications. Always check the wattage of your appliance to ensure it is within the wattage range of the converter or transformer you are using. Electronic appliances should be used with a transformer ONLY.

NOTE: Because of the difference between North American and foreign TV systems, the use of transformers with a TV or VCR will usually not make a North American TV or VCR usable overseas.

- Indicates converter/transformer to be used.



110 Volt Electric Appliances (Use with converters and/or transformers)	1 - 50W Transformer	50 - 2000W Converter	Dual Converter
Electric Shaver (under 25 watts)	•		• LOW
Hot Pots, Coffee Cup Heaters (over 50 watts)		•	• HIGH
Curling Irons & Brushes (under 50 watts)	•		• LOW
Heating Pads (over 50 watts)		•	• HIGH
Irons (under 1000 watts)		•	• HIGH
Clothes Steamers (under 1000 watts)		•	• HIGH
Electric Blankets (under 1000 watts - not continuous use)		•	• HIGH
Portable Hair Dryers (under 1875 watts)		•	• HIGH

110 Volt Electric Appliances (Use only with transformers)	1 - 50W Transformer	50 - 2000W Converter	Dual Converter
Contact Lens Sterilizer (under 25 watts)	•		• LOW
Toothbrushes (under 50 watts)	•		• LOW
CD Players (under 50 watts)	•		• LOW
Camcorder Battery Rechargers (under 50 watts)	•		• LOW
Radios (under 50 watts)	•		• LOW