Current

Why talk about current, current management circuits make everything Electrical / Electronic work.

Almost anything can be made to carry current. Generally copper wire is used most of the time although aluminum conductors are used sometimes

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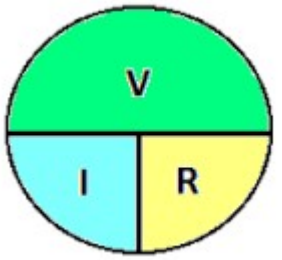
The line represents a conductor of a current. The relationship of I = V/R Ohms Law. Ohms Law may also be stated I = E / R a more historical version. The relationship is stated as an equation and the values need to be defined:

I A measure of current, the movement of charges precipitated by the movement of electrons.
V A voltage associated with the current.
R An associated resistance impeding the current.
There is no current that escapes Ohms law!



The circle chart can be used to select the diferent forms of Ohms Law.

A current can be either DC (Direct Current) or AC (Alternating Current). Inducing a current in a conductor may be done by exposing the conductor to a changing magnetic field:

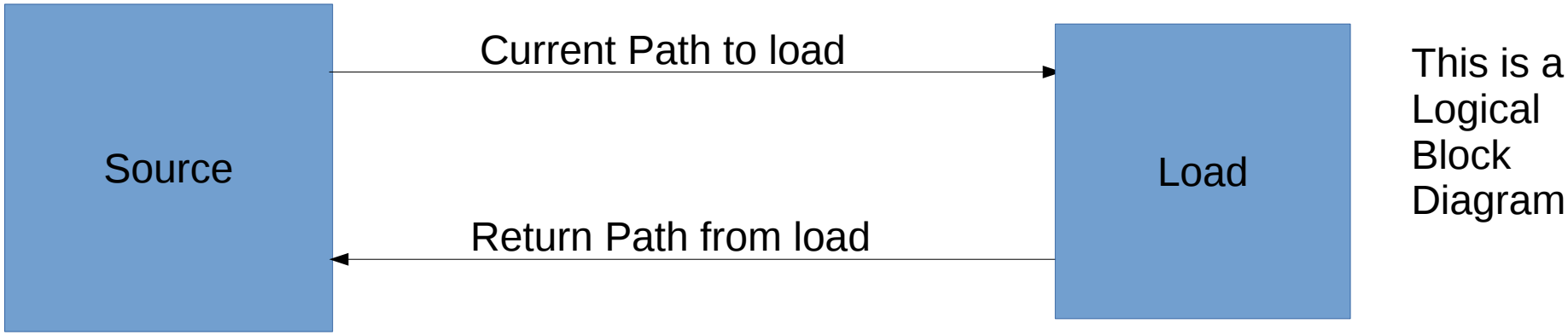
Changing Magnetic Field

A changing magnetic Field will induce an AC current in the conductor. Conversely a DC current in a conductor will create a static magnetic field.

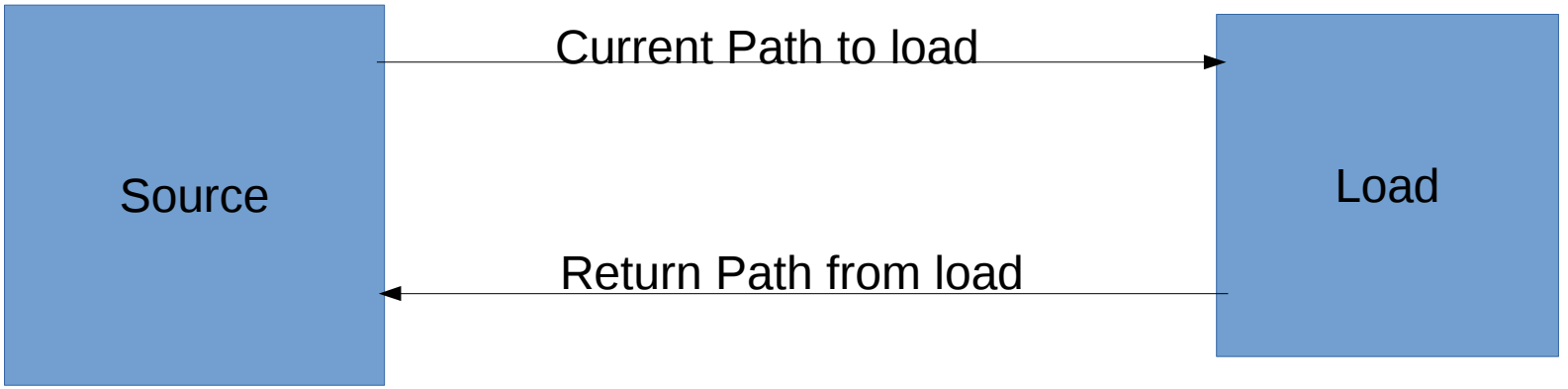
The idea of current and the fact when there is current through a conductor there are the I=V/R parameters an other relationship is present:

P=V*I

- P is power in the load or potentially sourced by the source.
- V The voltage present with the current.
- I The current moving through the conductor.



Complex Electrical assemblies are easier to understand when you break them into simple circuits with a logical block diagrams. A logical block diagram lets you label a block and or describe a function for each block without actually understanding what circuits might be in the block and the connecting conductors.

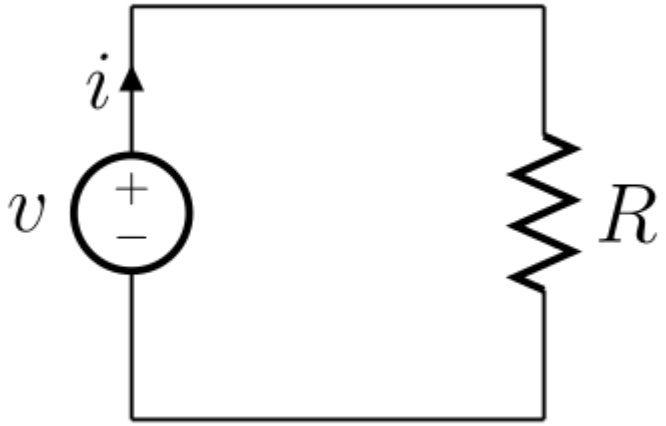


This block diagram shows a source of current, a current path to a load to make this current do something and a return current path from the load back to the source. This complete circuit is always present. Blocks usually contain components that are used for current management.

This simple block diagram may be used for either AC or DC currents all that would change is the description of the blocks.

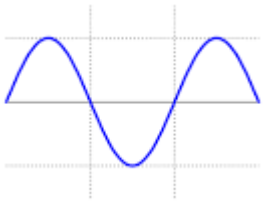
It should mentioned that the source current and the return current are always equil.

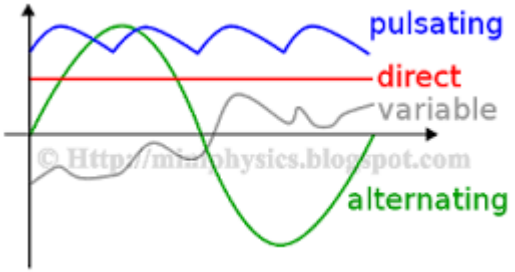
This drawing shows a polarized source DC circuit with the Voltage defined and sources current I. The current is relative to the load R. Ohms law I = V/R



This could have been displaying an AC source and Ohms law still applies there just wouldn't be any polarization in the drawing.

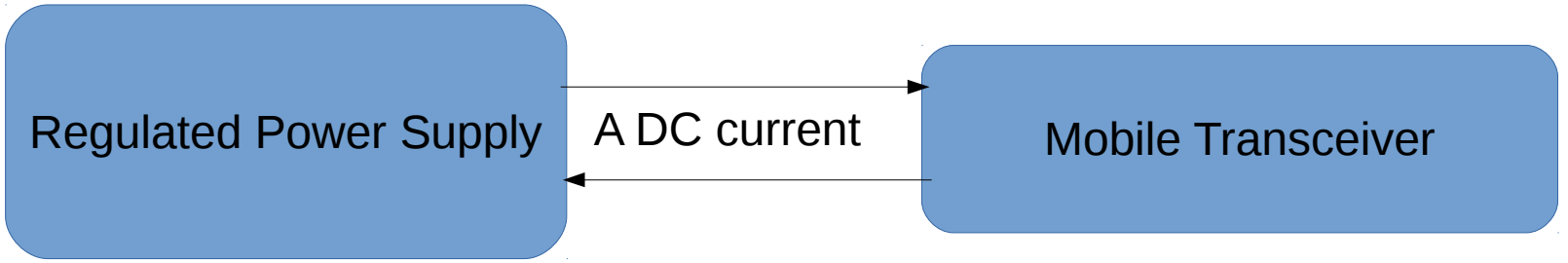
AC power the RMS value of a wave is equivalent to like value of DC power and will have the same heating effect of a DC power.
A sine wave and its harmonics may be selected to produce any wave shape desired.



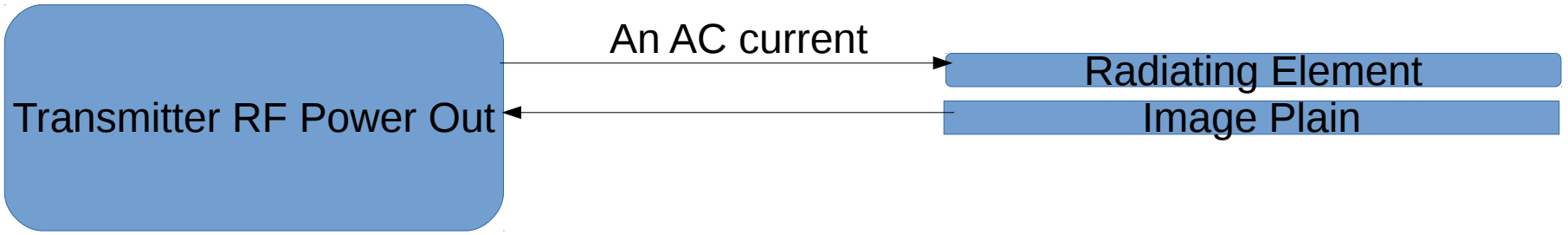


The second drawing shows a variety of waves that may be found in specific circuits. A wave is usually single cycle of a chain of cycles and the time it takes.

A few block diagrams to demonstrate some real world amateur radio currents . First: This would be a 12VDC with enough current to power a mobile transceiver used in your home or vehicle and the current is relative to the power output of the transmitter.



This would be the RF output from the transceiver to an antenna and the return current from the antenna image plane to the RF output. The radiating element is not DC coupled to the image plane but AC coupled.



The bottom Line:
Current management devices, transistors, diodes, inductors, capacitors are assembled into groups to make mixers, ampliphers. Judicious use of these assemblies make transmitters, receivers, transceivers and many other complex combinations.