The use of a lock and key-like interface to determine characteristics of power distribution on a direct current power bus

Patent Pending

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Abstract

This patent describes a system for supplying Direct Current (DC) power to a single or plurality of devices using a lock and key-like mechanism to determine delivered DC voltage, maximum current and polarity.

Most small electronic devices such as cell telephones, laptop computers, personal printers and many other devices are delivered with a small plug in power supply often referred to as a "wall wart" (see figure 1). The typical "wall wart" is large enough such that only one such device can fit in a typical wall receptacle. In a typical environment many "wall warts" are accommodated by daisy chained Alternating Current (AC) power strips. This arrangement is both inefficient (power supplies constantly consume electricity) and dangerous (daisy chained AC power strips).

By replacing the AC power strips with a DC Power strip more DC devices can be accommodated and a larger, more power efficient, AC-DC converter can be employed. Unlike AC where there is a single (in the US) standard of 110 Volts AC, DC requirements vary in voltage requirements, allowed current and polarity. A universal DC power strip must accommodate a wide variation of voltages, allowed current and polarity. This patent addresses this last problem by employing a lock and key like mechanism to signal device requirements (see figure 2 & 3).

The power supply will deliver regulated voltages appropriate to DC devices (typically 1.5v. 3v, 4.5v, 6v, 9v, 12v and 24v) to a bus carrying multiple voltages. Teeth or contacts on the key will select appropriate voltage, current and polarity through a series of switches or by direst contact. Power will then be transmitted when the key has been completely engaged (via a snap fit or by turning the key conventionally, See figure 4).

Claims

What is claimed is

1. A power distribution system for distributing power to a single or plurality of devices requiring different DC voltages, maximum current and polarity, comprising:
    a. a source of power
    b. power converter(s) for receiving AC power and converting it to a series of DC voltages;
    c. a separate DC power distribution bus for each voltage;
    d. a series of fuses or other means of limiting current;
    e. a key lock-like assembly with power contacts containing
        i. a series of switches that are activated by key teeth or
        ii. a series of contacts on the key shaft
        iii. key teeth will be on the male connector
        iv. lock assembly on the female connector
2. The power distribution system of claim 1 where the lock mechanism contains:
    a. a series of switches each making contact with a different voltage bus
    b. a series of switches each making contact with a different fuse or other current limiting mechanism
    c. a switch that changes default polarity.
3. The power distribution system of claim 1 where the lock mechanism contains:
    a. a series of contacts each making contact with a different voltage bus
    b. a series of contacts each making contact with a different fuse or other current limiting mechanism
    c. a contact that changes default polarity.
4. The power distribution system of claim 1 where the lock mechanism contains:
    a. an electronic or optical means of creating contact with a different voltage bus
    b. an electronic or optical means of creating contact with a different fuse or other current limiting mechanism
    c. an electronic or optical means of changing default polarity.
5. The power distribution system of claim 1 where the key like mechanism contains:
    a. a tooth (or teeth) or similar mechanism for selecting desired voltage
    b. a tooth(or teeth) or similar mechanism for selecting maximum current
    c. a tooth or similar mechanism for defining polarity.
6. The power distribution system of claim 1 where the key like mechanism contains:
    a. a contact or similar mechanism for selecting desired voltage
    b. a contact or similar mechanism for selecting maximum current
    c. a contact or similar mechanism for defining polarity.
7. The power distribution system of claim 1 where the key like mechanism contains:
    a. an electronic, optical or similar mechanism of selecting desired voltage
    b. an electronic, optical or similar mechanism for selecting maximum current
    c. an electronic, optical or similar mechanism for defining polarity

Drawings

Figure 1- typical SC power strip with multiple "wall wart" DC power supplies attached

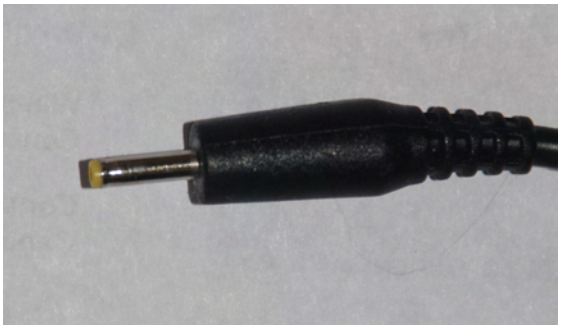

Figure 2 - Typical DC power connector

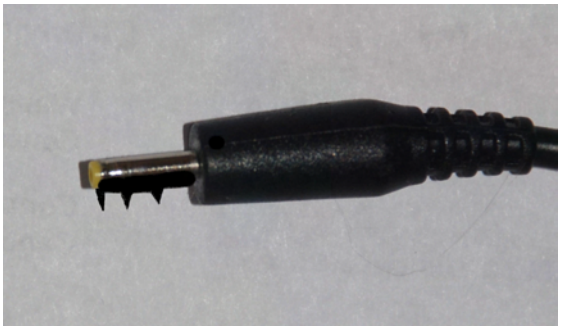

Figure 3 - DC Connector showing "teeth"

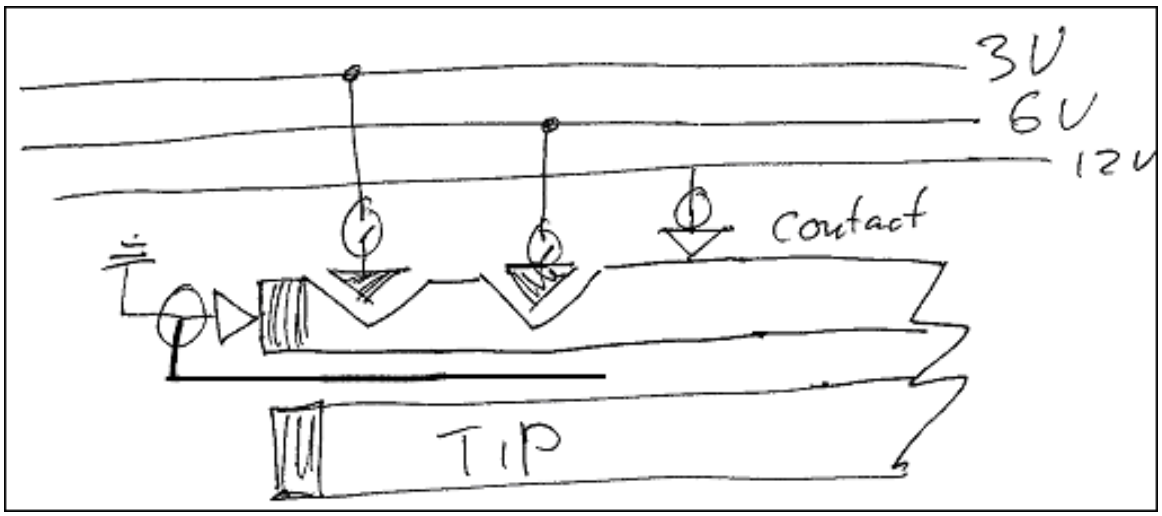

Figure 4 - schematic of lock & key operation showing 12 volts connected.

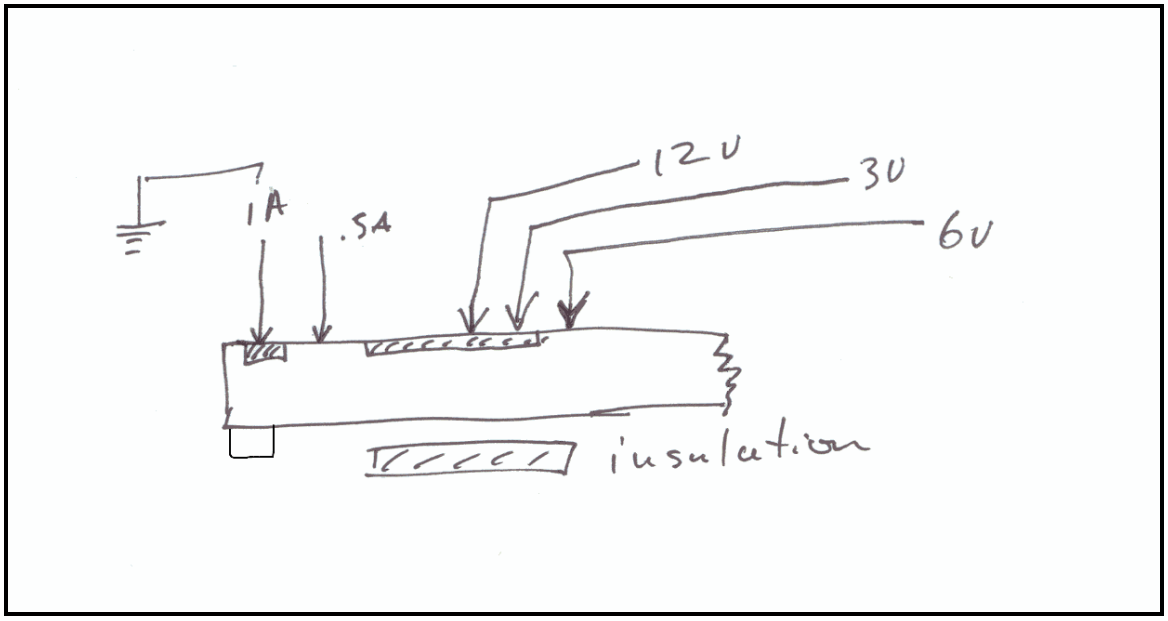

Figure 5 - schematic of contact showing 6 Volts and .5 Amps connected.