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Project: Voltage Reduction System (VRS)

- **Description:**
  - This device achieves energy savings by reducing the voltage delivered to metal halide and other kinds of street lamps.
  - If these lamps are sufficiently warmed up, the light of the lamps is reduced only 10 percent if the voltage applied to them is reduced by up to 50%.
  - This can be achieved through a VRS device. VRS allows the lamps to be warmed up and then can operate manually or use an Ethernet updatable schedule to change the applied voltage to the lamps.
  - This network device logs the energy use at the time of voltage changes and emails the data log daily to the device owner.
  - Owners Email along with many other options can be set through hosted web-pages on the device.
  - The weekly schedule allows the user to continue a preferred schedule week after week without the need to access the device many times.
  - The time is retrieved from internet from time to time to ensure accurate execution of the schedule.
  - VRS gives the consumer the choice of bypassed voltage and three different reduced voltages, ranging from 10% up to 50% less than the bypassed voltage in some models.
- **Technical Features:**
  - The firmware is running on an Ethernet-enabled microcontroller.
  - The firmware is designed for a network based device and uses TCP/IP Protocol.
  - Firmware uses “Cooperative Multitasking” to allow all the time sensitive network-based functions access to CPU time.
  - The firmware uses SMTP (Simple Mail Transfer Protocol) for sending out the daily data log.
  - The firmware uses SNTP (Simple Network Time Protocol) for synchronizing the time with the network.
  - The device acts as an HTTP Server and hosts web-pages for updating the schedule and other options.
  - Among other options email address and subject are customizable through the web-page interface.
  - Use of NetBIOS (Network Basic Input/Output System) for ease of access. No need for customer to know the IP address of the device.
  - Each device has a customizable NetBIOS name that the owner can change if there are multiple VRS devices in the network.
  - 12 Volt DC output activated in case of emergency or lost internet access which can be used to bypass the device out of the circuit if desired.
  - In case of no internet the device operates based on the last known configuration and keeps time with ±2 minute per day accuracy.
  - If there is no internet at the devices power-up the device will activate the 12 Volt DC output and operates only in manual or voltage bypass mode.
  - The device can be switched between the schedule mode and manual mode at any time.