Plug load devices would contribute up to 30% of the household electricity use by 2030 according to the U.S. Department of Energy projects. Smart energy management systems can reduce up to 15% of the total plug load consumption. In this study, we have developed a prototype energy management system that allows us to manage plug loads utilizing their unique load signatures. The reported system resides at electric outlet or switchbox level. It relies solely on the power footprint of each device to differentiate usage patterns through the same power line. Load signatures such as harmonics, active and reactive power, and various waveforms are tested using our detection algorithm. The future system would be highly robust and scalable for residential household and building level applications.