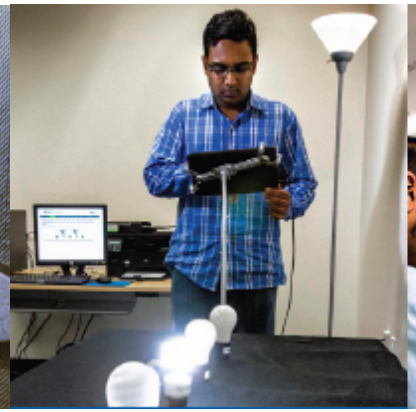
Operation Modes for Set-Top Boxes



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Oct. 30, 2012

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Challenges and Opportunities

Confusion is counterproductive for consumers, industry, and service providers, when trying to

Compare models

Market products

Choose products

Meet regulations

Opportunity: Standard terminology and operation symbols help educate consumers to properly operate STB for energy saving.

Goal

- **To create a universal terminology and labeling system for set-top boxes.**
  - **A standard set of power modes to facilitate technical communications.**
  - **Compatible for satellite, terrestrial, cable, or IP TV implementations.**
  - **Recommended target power levels associated with function modes**
  - **Evaluating effectiveness of consumer education and recommending a proper use of power saving modes**

Category	Existing modes	IEC/COC	Energy Star
On	Active	On (Play)	On (Active, In-use, normal)
	Ready	Standby Active	
	Power Saver		
Sleep	Light sleep	Standby Passive	Sleep
	Deep Sleep		Deep Sleep
Off	Unplugged / Relay-off	Disconnected	

CalPlug Methodology

- **Initial survey:**
  - EnergyStar, CEA (Consumer Electronics Association), CEC (California Energy Commission), OEE (Overall Equipment Effectiveness), NRDC (Natural resources defense council); International: IEA (International Energy Association), and other countries such as China (CSC), Korea, Australia and Europe.
- **Define and recommend no more than five standard operational levels**
- **Evaluation criteria**
  - (a) significant differences in power consumption (>10%) between levels,
  - (b) feasibility for manufacturers,
  - (c) customer education and ease of use, and
  - (d) Compatibility for satellite, terrestrial, cable, or IP implementations
- **Work with manufacturers, service providers, and research institutes to generate support for the new definitions.**

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One example: EnergyStar

- On Mode: connected to power source, has been activated and may be providing one or more primary functions.
- Sleep Mode: connected to power source, is not providing a primary function, and offers:
  - To facilitate the activation of other modes (including activation or deactivation of On-mode) by remote switch (including remote control), internal sensor, timer.
  - Continuous function: information or status displays including clocks and sensor-based functions;
- Deep Sleep State: A power state within Sleep Mode characterized by **reduced power consumption** and **increased time** required to return to full On-mode functionality.
- Off State: Not defined.

Another example: IEEE1621

- Goal: Maximize consistency across devices and simplicity and clarity for users.
- Power state definitions:

– **Hard-off:** An off power state in which the device uses **no power** from the mains or a normal operating battery.

– **Soft-off:** An off power state in which the device may use **some power** from the mains or a normal operating battery.

– **On:** A power state in which the device has **greater** (or similar) power consumption, capability, and responsiveness than it does in the sleep or off state.

– **Off:** A power state in which the device has **less** (or similar) power consumption, capability, and responsiveness than it does in the sleep or on state.

– **Sleep:** A power state in which the device has **greater** (or similar) power consumption, capability, and responsiveness than it does in the off state, and has **less** (or similar) power consumption, capability, and responsiveness than it does in the on state.

– **Unplugged:**

Nomenclature + Functions + Power levels + Operation Symbols

- **By absolute power in Watts?**
  (Will different manufacturers drop different functions?
  Will functions be left to other devices?)
- **By percentage of maximum power?**
  (But no ceiling on the maximum?)
- **By functions engaged?**
  (But STB functions keep changing, expanding…)
- **By understandable symbols** correlating with functions and power?

Evaluation Criteria

Complete harmonization is probably not possible, perhaps not desirable. But these features of the categorizations should guide us:

- Ease and consistency of testing
- Clarity for regulation
- Clarity for customers
- Encouragement of customer use
- Forward compatibility with anticipated features
- Backward compatibility with existing stock

Thank you!