

Printers and Energy

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Topics



Paper
User Interface
Test Procedure
Proxying

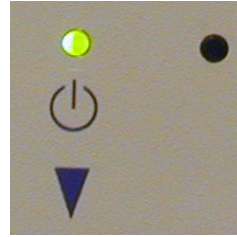
eman

- Power States

Paper

Paper in printers/copiers may be larger use of energy than electricity
~ 16 Wh/sheet (data circa 1995)
Duplexing and n -up imaging important for energy

Power control elements



Power Management Timeout Periods
(in minutes)

Power Mode	IDE Drive	Monitor Suspend	Monitor Off
DISABLED	Never	Never	Never
MAXIMUM	20	10	60
REGULAR	20	20	60
MINIMUM	20	60	Never

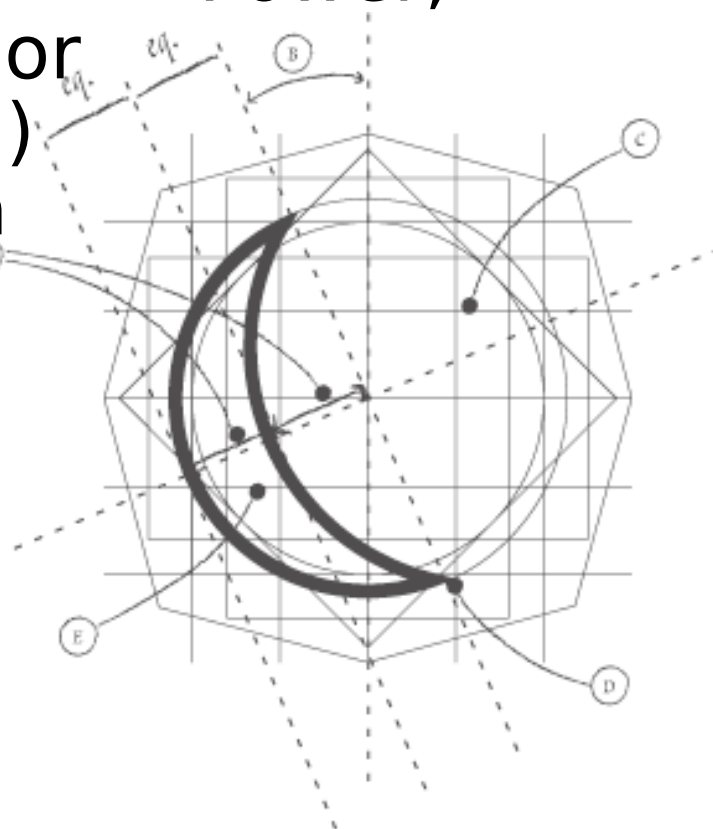


Key Elements of IEEE 1621 - Power Control

3 Basic Power States: On, Sleep, Off

... with standard colors: **Green**, **Amber**,
Key symbols:  Power,  Sleep

Sleep Metaphor
("wake up")
"Hibernate" a
form of Off



(A) width is one half of radius

(B) 23° - the tilt of the earth on its axis

(C) Crescent moon opening to the right

(D) Points exactly 180° apart

(E) Can be used open - ☾ - or filled - ☾

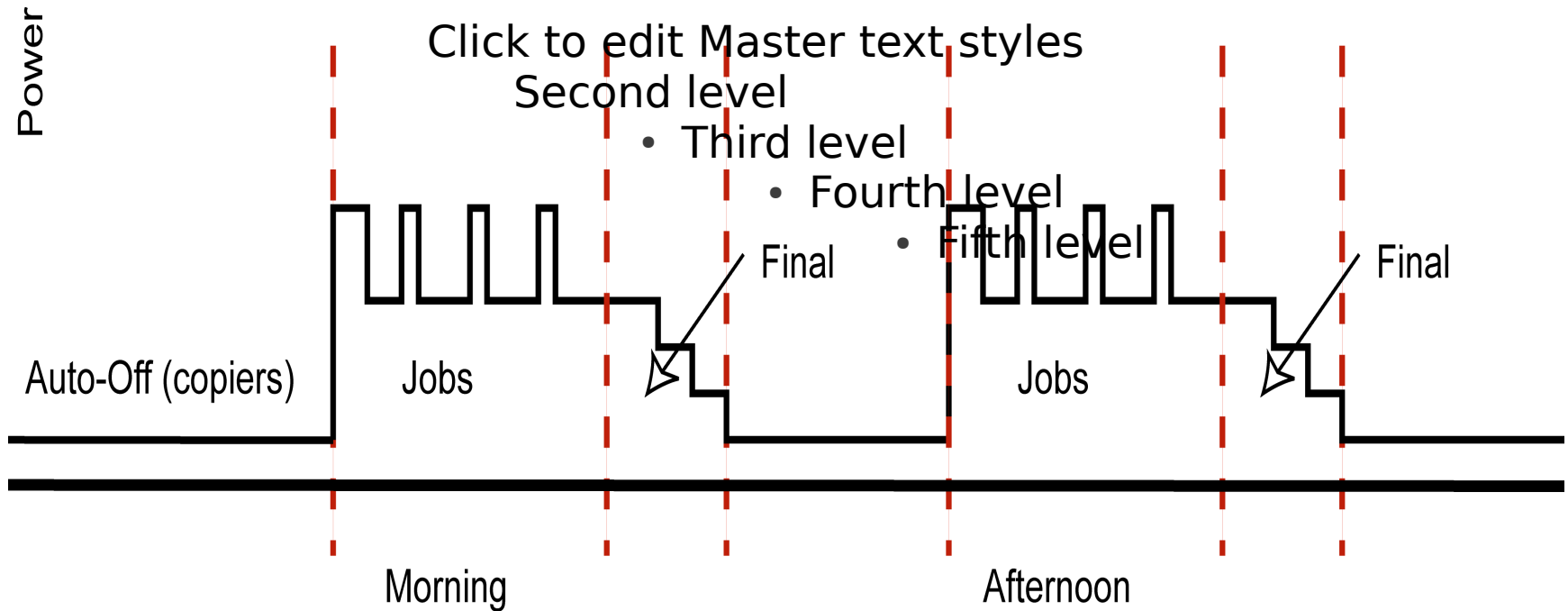


Test Procedure





Calculation Method



Schematic example of 8 ipm copier with 4 jobs in morning, 4 in afternoon, two "final" periods, and Auto-Off between the morning and afternoon and overnight. Lunchtime is implied but not explicit. Drawing **not** to scale.

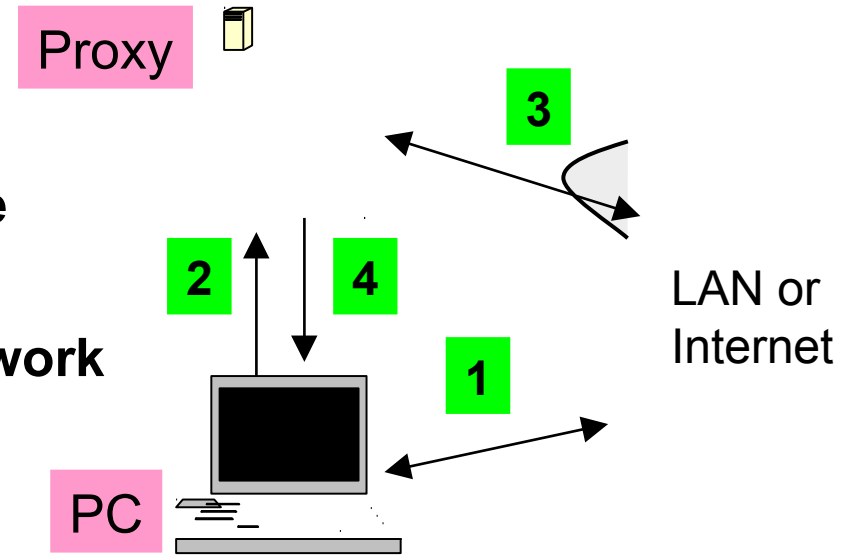
Jobs are always 15 minutes apart and in two clusters. There are always two full final periods regardless of their length. Printers (and MFDs with print capability) use Sleep rather than Auto-Off as the base mode but are otherwise treated the same as copiers.

Network Connectivity Proxying



Proxy operation

- 1 PC awake; becomes idle
- 2 PC transfers network presence to proxy on going to sleep
- 3 Proxy responds to routine network traffic for sleeping PC
- 4 Proxy wakes up PC as needed



Proxy can be internal (NIC), immediately adjacent switch, or “third-party” device elsewhere on network

Proxy does: ARP, DHCP, TCP, ICMP, SNMP, SIP,



Proxying

Purpose: Reduce power required for idle or sleeping printers (and PCs, etc.)

Standard: Ecma-393

Includes SNMP, Wake on TCP SYN, ...

IETF - eman

Goal - define basic mechanism to report energy and power data
All products, primarily monitoring, include complications not applicable to printers

Power states

3? 6? 12? 100?

Current thinking - IANA registry of sets of states

Initially: 1621, ACPI, DMTF, PWG

Thank you

