Smart Home Hacks

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O'Reilly Mac OS X Conference
Oct. 28, 2004
Let’s Get Smart

- Building Blocks
- The Zen of Home Automation
- Five Fun Hacks
Your Power Line Network

• X10 is a “power line carrier” protocol
• Ubiquitous, but not perfect
• Easy to add to an existing home
• Variety of inexpensive devices
X10 Details

• Serialized commands sent over the AC power line
• X10 modules are connected to power line and listen for commands
• All modules are always listening for commands
• Modules respond when they see a command with their X10 address
  – House codes: A-P
  – Unit codes: 1-16
  – Example X10 address: B5
Lamp & Appliance Modules

• Modules let you control:
  – Lamps
  – Fans
  – Coffee Pots
  – Radios
Motion Detectors

- Passive Infrared Detection
- Battery-operated
- Sends wireless signal to a nearby transceiver
- Transceiver relays signal to the power line
- Not exactly instantaneous
Sending X10 Commands

• Mini-controllers let you manually send X10 commands
• Turn lights on or off
• Dim lights
• Trigger a macro in your home automation software
Add a Brain to Your Smart Home

Move Beyond Remote Control
Indigo

www.perceptiveautomation.com
XTension
www.shed.com
/* If it's after 10PM and Unit B2 is off, then dim A7 by 20%, wait five minutes, then turn A7 off. */

% [ `date +%H` -ge 20 ] && [ $((X10_B2)) -lt 128 ] && heyu turn a7 bright 5; sleep 300 ; heyu turn a7 off
Misterhouse
www.misterhouse.com
Ante Up

If you have a USB-to-Serial Adapter handy:

- $70 ActiveHome Starter Kit
  - www.x10.com/products/ck11a_sp_8pc_39c70.html
- XTension or Indigo (Try both demos)
Ante Up

If you don’t want to buy a USB-to-Serial Adapter:

– Indigo and Smarthome.com Bundle Deal
  – $90 for Indigo
  – $35 for SmartLinc USB and one lamp module
Ante Up

Bottom Line:
- Spend $100 - $135 to decide if you like it
- Less if you use free software
- More if you get hooked (You have been warned.)
The Zen of X10
X10 is less than perfect

• Transmission timing means it takes 1.5 seconds to send commands.
  – Longer if you’re using wireless devices, like motion detectors
• Electrical noise can block commands
  – Power supplies, electric toothbrushes, fluorescent lights
• Normalize your electrical environment
  – Filters & signal boosters
  – www.smarthome.com/x10troubleshoot.html
• Relax, take a deep breath
  – Do you drop AirPort because the microwave knocks you offline?
Five Fun Hacks
Detect a Beer Thief
What it does
Keep an eye on the babysitter, or your teenagers, while you’re away from home.

Courtesy of Michael Ferguson
Motion detector

- Mounted on inside of the door
- Opening door sends two signals:
  - motion
  - dusk-to-light
- Silently write message to log
- Say “You’re busted!”
- Sound an alarm
In the liquor cabinet

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Hacking the hack

• Use this technique to monitor:
  – The fridge, for dieters.
  – The gun cabinet.
  – Your car, parked in the garage.
  – The furnace closet, to log when you last changed the air filter.
Track Events with iCal
What it does
Adds events to iCal so you can keep track of activity around your home.

Courtesy of Greg Smith
on LogIniCal(theCalName, theSummary, theNote, theLocation, eventdate, EventKind)
    tell application "iCal"
        set CalList to (title of every calendar)
        if theCalName is not in the CalList then create calendar with name theCalName
        set TargetCal to (first calendar whose title is theCalName)
        if EventKind is true then
            make event at end of events of TargetCal with properties {start date:eventdate, summary:theSummary, description:theNote, location:theLocation, status: tentative}
        else if EventKind is false then
            try
                set EventList to (every event whose summary is theSummary) of TargetCal
                set TargetEvent to (last item of EventList whose status is tentative)
                if status of TargetEvent is tentative then
                    set (end date) of TargetEvent to eventdate
                    set status of TargetEvent to confirmed
                end if
            on error
                make event at end of events of TargetCal with properties {start date:eventdate, summary:theSummary, description:(theNote & " (no starting event found)")}, location:theLocation, status: cancelled}
            end try
        end if
    end tell
end LogIniCal
on LogIniCal(theCalName, theSummary, theNote, theLocation, eventdate, EventKind)
    tell application "iCal"
        set CalList to (title of every calendar)
        if theCalName is not in the CalList then create calendar with name theCalName
        set TargetCal to (first calendar whose title is theCalName)
        if EventKind is true then
            make event at end of events of TargetCal with properties {start date:eventdate,
                summary:theSummary, description:theNote, location:theLocation, status:
                tentative}
        else if EventKind is false then
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                set EventList to (every event whose summary is theSummary) of TargetCal
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                    summary:theSummary, description:(theNote & " (no starting event found)")},
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        end if
    end tell
end LogIniCal
Calling the attachment

• Log the starting time

  – Parameters
    – Calendar Name, Event Name, Notes, Location, Date, Start/Stop

• Log the ending time
The result
A workday log
Hacking the hack

• Publish the calendar on .Mac so you can check in on your home while you’re on the road.
• Use separate calendars for different types of events.
• Download Greg Smith’s original script
  – http://homepage.mac.com/gregjsmith/
Spousal Approval Factor
Simulate a Sunrise
What it does

Gently brightens the bedroom lights so you wake up naturally.

Starting 15 minutes before the time that you want to wake up, raise the light level in the room.
SunRise clock
http://www.dreamessentials.com/a_clocks_sunrise.aspx

$110.
**XTension script**

*Scheduled to begin 15 minutes before your wake-up time*

- `dim "Bedroom Lamp"` to 10
- `dim "Bedroom Lamp"` to 20 in 3 * minutes
- `dim "Bedroom Lamp"` to 30 in 5 * minutes
- `dim "Bedroom Lamp"` to 50 in 7 * minutes
- `dim "Bedroom Lamp"` to 75 in 9 * minutes
- `dim "Bedroom Lamp"` to 80 in 11 * minutes
- `dim "Bedroom Lamp"` to 100 in 14 * minutes
XTension repeating event
Monday—Friday, 15 minutes Early
Hacking the hack

Make it smarter

• If you’re not at home, because you’ve left earlier or are on vacation, skip the whole process.
  
  if (status of "Gordon Home") is true then
    dim "Bedroom Lamp" to 10
    dim "Bedroom Lamp" to 20 in 3 * minutes
  [...]  
  end if

• Reverse the technique to dim the lights when you go to bed.
Outdo Big Ben
What it does

A high-fidelity grandfather clock that doesn’t chime while you’re sleeping or watching a movie.

Courtesy of David Kindred
The script

set theTime to (current date) as string
set theHour to word 5 of theTime
set theName to theHour & ".wav"
set thePath to (path to documents folder) & "BigBen:" & theName as string
set theFile to thePath as alias

tell application "QuickTime Player"
    set theMovie to open file thePath
    set close when done of theMovie to true
    play theMovie
end tell
Indigo Repeating Event

Every day, every hour
Indigo Repeating Event

When “bellsOK” is true
Indigo Repeating Event

Run the script
Hacking the hack

Make it smarter

• Set up a scheduled event that silences the bells ("bellsOK" = false) at bedtime, while you’re gone, or other appropriate moments.
• Use the half-hour and quarter-hour chimes, too.
• Set the system’s volume before and after playing the sound files.
• If you don’t have a home automation system (yet) use cron or iCal to schedule the script.
Hamster-Powered Night Light
What it does
Harness your hamster’s nocturnal running to power a night light.

Courtesy of Dan Fink
The specifications

• A visit to the pet store showed that most rodents achieve between 40 and 60 RPM on their exercise wheels.

• Cheap exercise wheels are noisy, which means they’re wasting energy. Use a ball-bearing mount instead. (Scavenged from a skateboard.)
The specifications

• Build an alternator into the exercise wheel
  – mount the wheel on stand
  – add a circle of magnets around the outside perimeter
  – wind two coils of enamled magnet wire (connected in series)
The light

- Two bright red LEDs.
- Wired backwards to each other, so one is lit, depending on which direction the wheel is spinning.
- Plenty bright for lighting the way to the bathroom during the night.
Why stop there?

• Calibrate the bicycle computer to the circumference of the exercise wheel.
• Skippy regularly achieved 2 to 3 MPH.
• The computer keeps track of peak speeds, elapsed time, and how many Hamster-Miles (hM) are run each night.
Skippy the Hamster

In memoriam
Thank you.

www.gordonmeyer.com