USNAP Alliance Update

H2G DEWG Meeting

December 2, 2010
Enabling HAN Device Eco-System

This is your HAN

Any AMI Network

This is your HAN on USNAP™

Fragmented Standards

Open Connectivity
HAN Connectivity Solution

Universal HAN Connectivity!
USNAP Progress

- Alliance established in 2009
- Published 1.0 specification in Q3 2009
- Published 2.0 specification in Q4 2010
- Retail products available
- Developing test plan and procedures
- Developing PLC spec
USNAP 1.0 Products

Communicating Thermostat
Wi-Fi portal with iPhone app
Communication options – ZigBee, Wi-Fi, Z-Wave
Radio Thermostat Company of America

Remote Appliance Controller
Controls 2 loads for HVAC, water heaters, pool pumps, and more
Communication options – ZigBee and RDS
Entek Systems

Communicating Thermostat
iPhone energy application
Communications options – Wi-Fi
Intwine Energy
USNAP 1.0 Products

WiFi Smart Plug
120/240 Volt Single Phase 15 Amp Switched Receptacle
Our Home Spaces

In-Home Display
Real time energy feedback
Communication options – ZigBee, Wi-Fi, Z-Wave
Aztech Associates

Home Controller
Wireless bridge with web interface
Communication options – Ethernet, ZigBee, Wi-Fi, Z-Wave
Bulogics
Physical connector & form factor

Physical & Data communications layers (chip-to-chip)

Smart Grid Device API

Specs available @ www.usnap.org
Technical Highlights

• Small footprint: 47mm x 41mm (less than 2” squared)
• Standard 10-pin connector costs < $0.10 each
• Cost delta to provide USNAP features is < $1.00
• PCB option for larger radios and antennas
• Leverages low-level SPI bus for chip to chip comms
• RF Modules currently available for FM/RDS, FlexNet®, Trilliant, Wi-Fi, ZigBee, Z-Wave
Physical Layer

[Diagram showing a circuit board and a thermostat with the number 75 displayed on the screen]
Data Link Layer

- USNAP only sends data in a single direction at a time
- The first side to assert the signal line is the sender
- The receiver will always send a 0xAA character during data transfer
Application Layer

- Programmatic model
- Either module or device can initiate commands
- The UCM responsible for communicating with an external entity
- SGD only knows about the USNAP commands listed in spec
- UCM is responsible for passing through commands or “remapping” from other communication protocols
Command Structure

- Command structure uses three main concepts: get, set and send
- Commands with 0 data count are reads (getters)
- Commands with a non-zero data count are writes (setters)
- Sub commands with bit 7 == 0 are request commands, sub commands with bit 7 == 1 are replies to a request command (that correspond to bit 7 == 0)
- When a payload data structure has mandatory and optional fields, the mandatory fields are listed first

<table>
<thead>
<tr>
<th>Byte</th>
<th>Hex value</th>
<th>Comments</th>
<th>Mandatory/Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0x??</td>
<td>UINT8 - Message ID Command Byte</td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>0x??</td>
<td>UINT8 - Message ID Sub-Command (will never have bit 7 on – see below)</td>
<td>M</td>
</tr>
<tr>
<td>3</td>
<td>0x??</td>
<td>UINT8 - Data Count (min: 0 max: 124)</td>
<td>M</td>
</tr>
<tr>
<td>...</td>
<td>0x??</td>
<td>Data (aka Application Payload)</td>
<td>Varies</td>
</tr>
<tr>
<td>N</td>
<td>0x??</td>
<td>UINT8 - Checksum Byte</td>
<td>M</td>
</tr>
</tbody>
</table>
USNAP Technical Roadmap

- Appliance simple interface
- Smart Energy Profile 2.0
- Smaller plastic enclosure
- Power line carrier
- IP pass through
- Climate Talk?
Questions?

Thank You!

www.USNAP.org