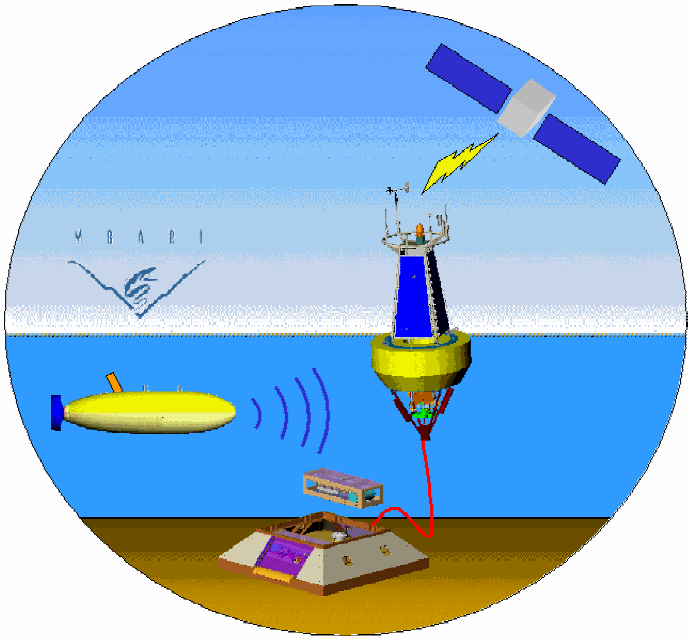
Instrument Puck Hardware



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SIAM Design Review

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M B A R I

What is a Puck?

- The puck is a small persistent memory store that can reside on or very near a sensor

- Implementations may expand beyond that definition

Specification vs. Implementation

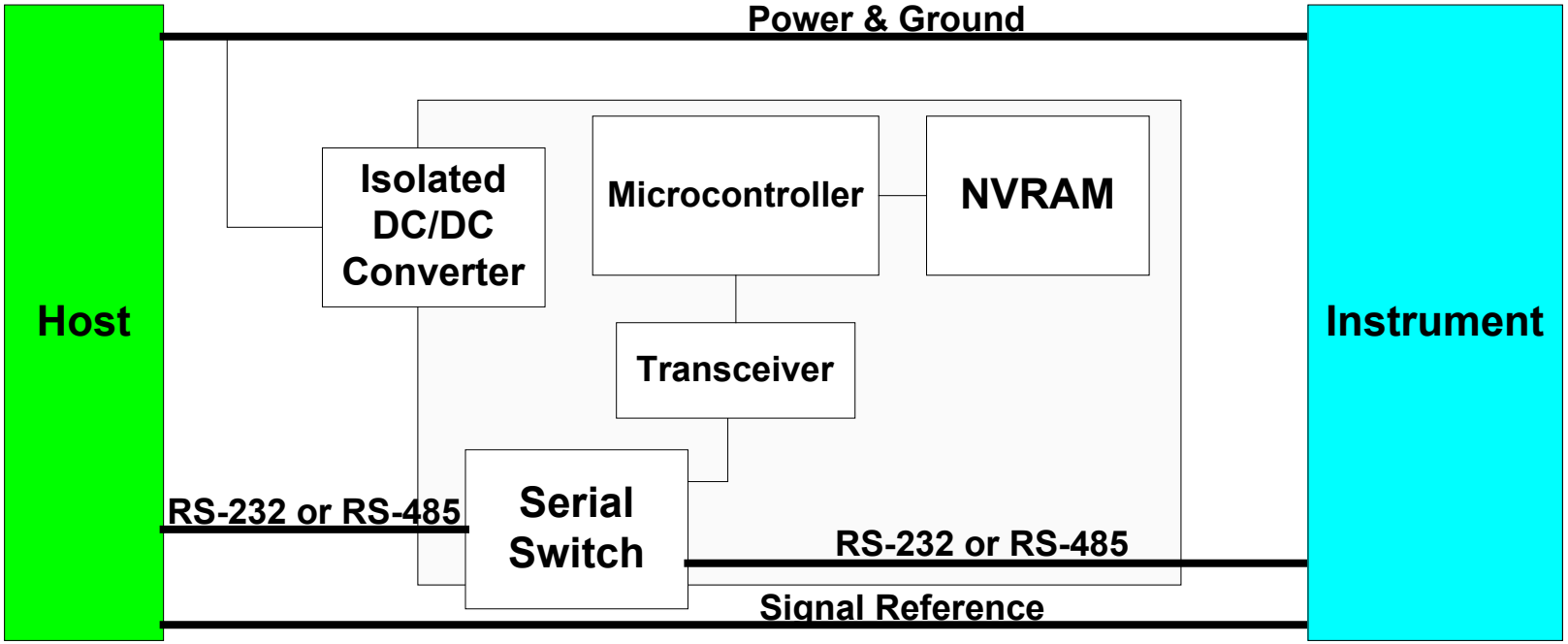
- Puck = software + NV memory

- MOOS mooring implementation
  - Generic ‘plug-n-work’ configuration device for various non-puckified instruments
- Serial shutter implementation
  - Implemented inside instrument
  - Uses components already used in primary design

MOOS requirements

- Beyond the basic puck specification:
  - Host/Instrument direct communication after puck data retrieval
  - Support RS-232 and RS-485 interfaces
  - Won't translate between serial interfaces

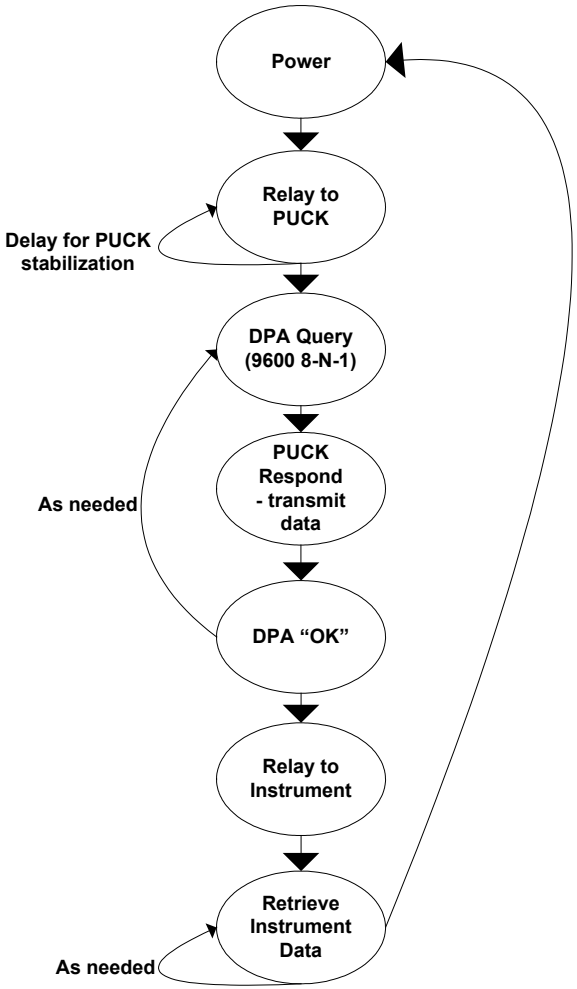
Block Diagram



- MOOS “Executive” Puck Implementation

State Diagram

- Powerup = Puck
- Query puck
- Instrument mode
- Cycle power -> Puck

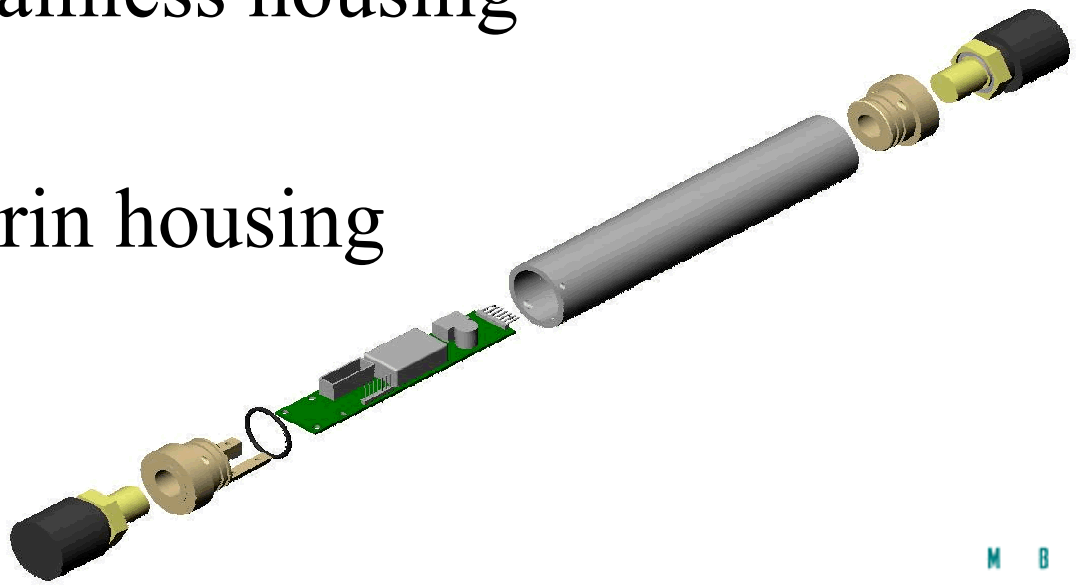


Power Consumption

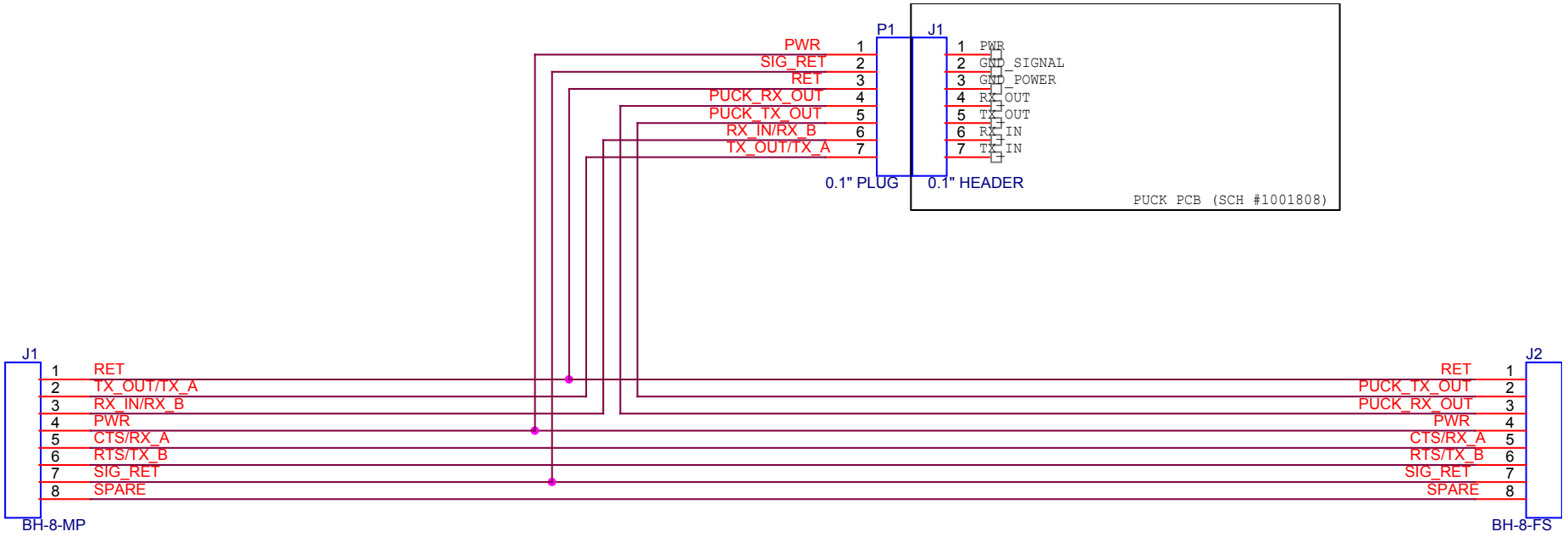
- Tested reliably over 7,000+ cycles
- Original “Executive”
  - Puck mode: 70.9mA @ 15.0V (1.06W)
  - Instrument mode: 27.29mA @ 15.0V (409mW)
- Revised “Executive”
  - Puck mode: 94.7mA @ 14.4V (1.37W)
  - Instrument mode: 9mA @ 14.4V (130mW)

MOOS Puck Assembly

- In-line 1 ¼” diameter pipe, 13 ¾” long
- Impulse 8-pin connectors
- 0 to 4000m stainless housing
  - tested
- 0 to 500m delrin housing
  - modeled



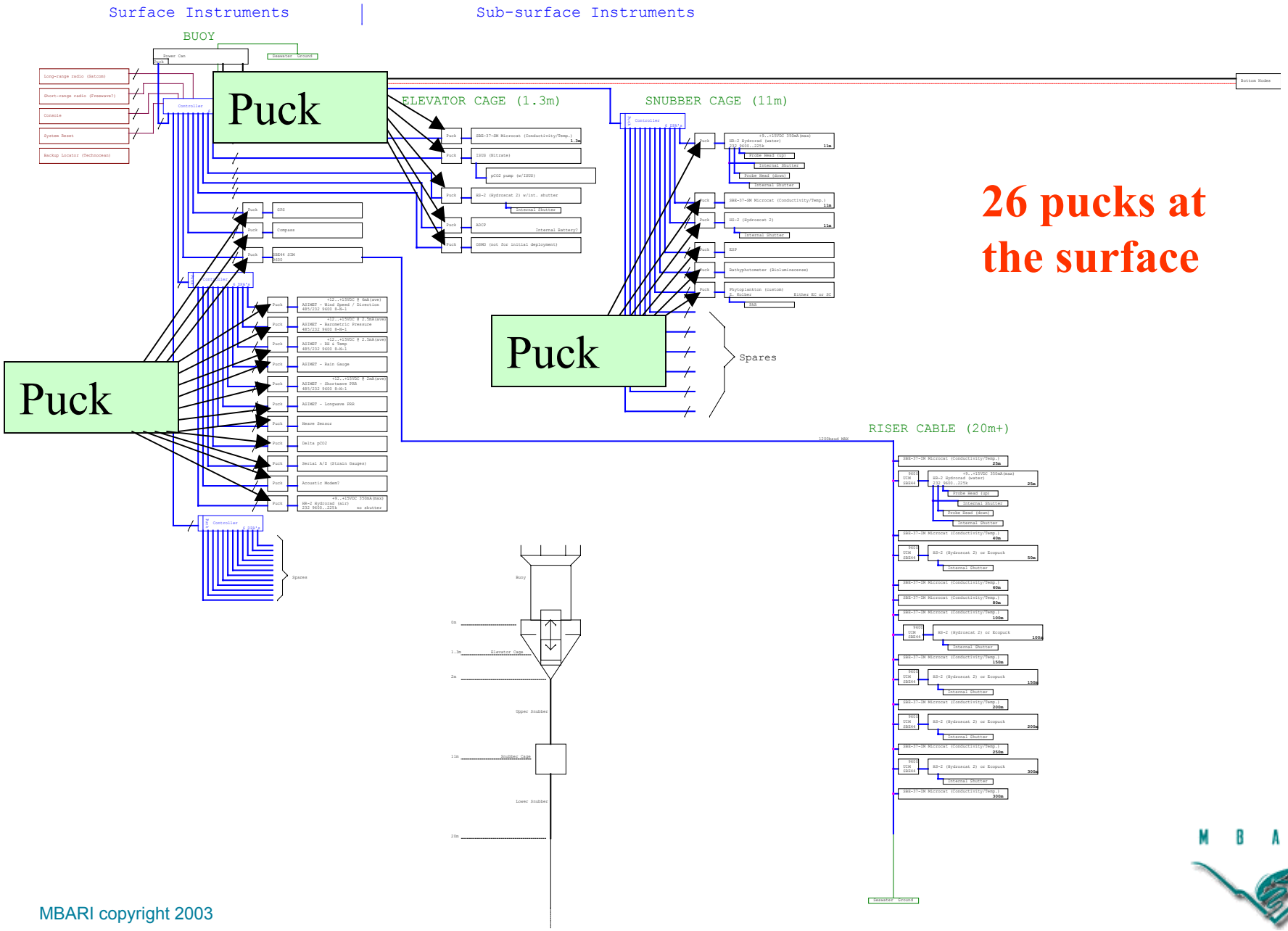
MOOS Assembly Wiring



Next MOOS Deployment

- Currently 10 executive pucks
  - 7 outside controller can (external instruments)
  - 3 inside controller can (internal instruments)
- One integrated puck instrument
  - Power can controller

Future MOOS Buoy

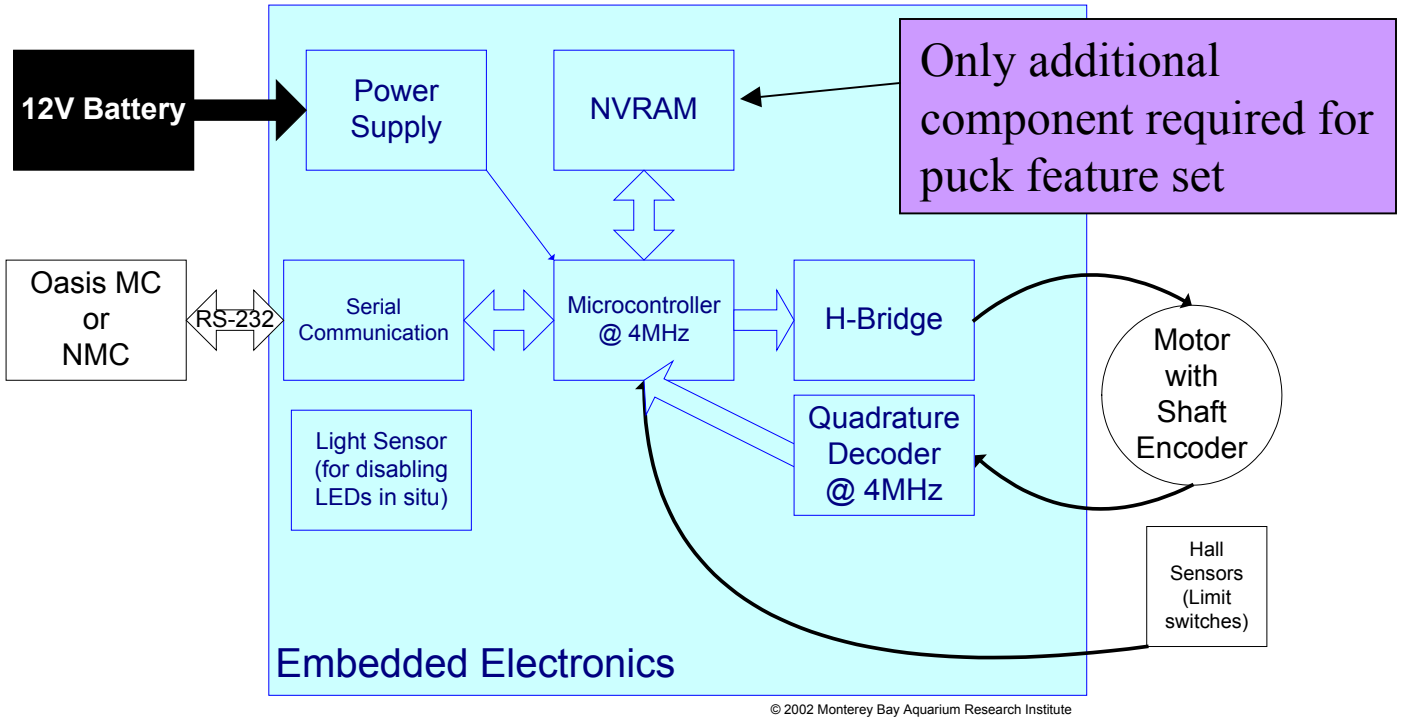


26 pucks at the surface

Serial Shutter Instrument

- Copper shutter for anti-biofouling on optical instruments
- Designed for puck compatibility
- Contains puck components. Not a puck

Shutter Block Diagram



- Serial Shutter Puck Implementation

Future Pucks

- Implementations
  - Non-isolated RS-232 only
    - Smaller, less energy, cheaper
  - Non-isolated RS-485 only
    - Smaller, less energy, cheaper
  - Solid-state pressure tolerant
    - Smaller, cheaper
- Improvements
  - Microwatt isolated DC/DC converter
    - Less energy

Questions about hardware?