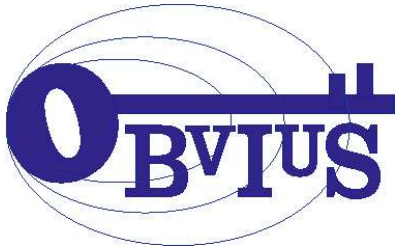
Best Installation Practices

AcquiSuite A8811-1
ModHopper R9120-3



Agenda

- General best practices guidelines
- Site survey best practices
- Installation best practices
- Commissioning best practices

General best practice guidelines

General best practices

- **BP #1:** Avoid objects or locations likely to interfere with radio signals:
  - Cell repeaters
  - Metal cans or housings
  - Thick concrete walls
- **BP #2:** Allow minimum of 10 feet of separation between ModHoppers
- **BP #3:** Each Modhopper ***must*** have a Modbus address that is unique from all other Modbus devices on the network

General best practices (2)

- **BP #4:** Consult factory before wiring ModHoppers together on RS 485
- **BP #5:** Keep ModHoppers away from conduit or sources of electrical noise
- **BP #6:** Avoid adding hops to long runs as this will increase latency, consider hard wiring if possible

General best practices (3)

- **BP #7:** Use shielded twisted pair (Belden 1120A or equivalent)
- **BP #8:** Use additional ModHoppers to balance the load in high density areas
- **BP #9:** Use high gain antennas with caution as they may cause the network to shift high traffic levels to the high gain segment

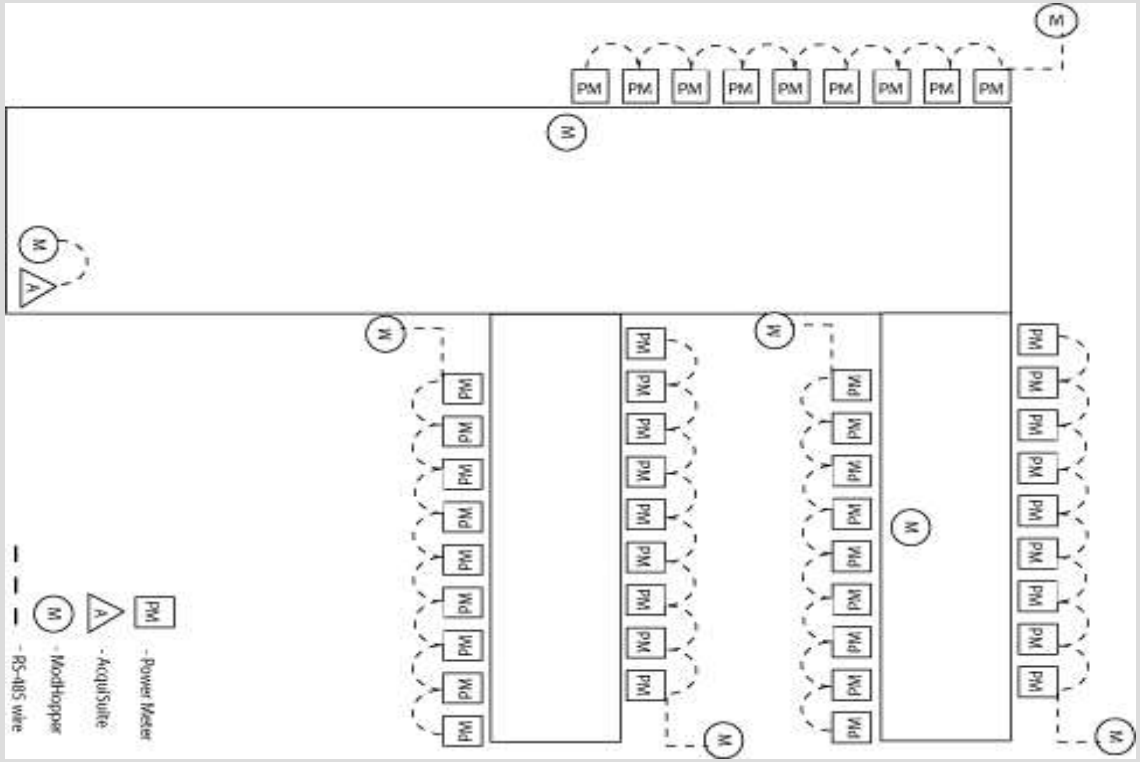
General best practices (4)

- **BP #10:** If you are using Modbus meters, limit the number of devices per AcquiSuite to 70 or less to maintain acceptable throughput

Site survey best practices

Site survey best practices

- **BP #1:** Map the quantities physical locations of meters on a layout of the building to properly balance the loads



Site survey best practices (2)

- **BP #2:** Add ModHopper(s) to the layout to look for logical communication sub-networks
- **BP #3:** Try to minimize the number of “hops” that data must make to reach the AcquiSuite as each hop adds latency to the network
- **BP #4:** Assign Modbus addresses to the ModHoppers on the layout to avoid duplication later

Site survey best practices(3)

- **BP #5:** If possible, locate the AcquiSuite(s) as close as possible to the center of the building
- **BP #6:** Arrange nodes in a star or cluster rather than a linear arrangement
- **BP #7:** Whenever possible, locate the ModHoppers on outside walls to minimize the amount of metal that will be encountered

Site survey best practices(4)

- **BP #8:** Large clusters of Modbus meters should have 3 hops or less to the AcquiSuite
- **BP #9:** Areas where cell phone coverage is poor are also likely to be poor locations for ModHoppers

Site survey best practices(5)

- **BP #10:** Verify with site personnel the presence of cellular repeaters or WiFi networks as they may cause interference

Installation best practices

Installation best practices

- **BP #1:** Mount the ModHoppers a minimum of 10 feet from other radios (including other ModHoppers)
- **BP #2:** Do not mount the ModHopper on metal or with the antenna touching conduit

Installation best practices (2)

Installation best practices (3)

- **BP #3:** Do not mount the ModHopper on a wall with lots of metal on the other side as this will limit the distance covered
- **BP #4:** Do not run cable or conduit over the ModHopper
- **BP #5:** Mount the ModHopper at the highest practical elevation (even a couple of feet can make a significant difference)

Installation best practices (4)

- **BP #6:** Whenever possible, mount the ModHoppers at the same elevation (but avoid large metal obstructions)
- **BP #7:** Assign a band of addresses to be used in addressing ModHoppers that is separate from meter addresses to avoid duplication

Commissioning best practices

Commissioning best practices

- **BP #1: Always bring the network on line in stages, never all at once!**
- **BP #2:** Bring the communications network (AcquiSuites and ModHoppers) on line first, then bring meter banks on one at a time
- **BP #3:** Once the communications network is established (BP #2), verify the Modbus addresses of all meters to avoid duplication, especially of ModHopper addresses

Commissioning best practices(2)

- **BP #4:** Bring the meter banks on one at a time by connecting the RS485 wire to the ModHopper
- **BP #5:** Allow time for the network to settle out (at least 10 minutes) as each bank is brought on line
- **BP #6:** If link quality is poor, verify addresses and wiring. If correct, add an additional ModHopper to balance the load