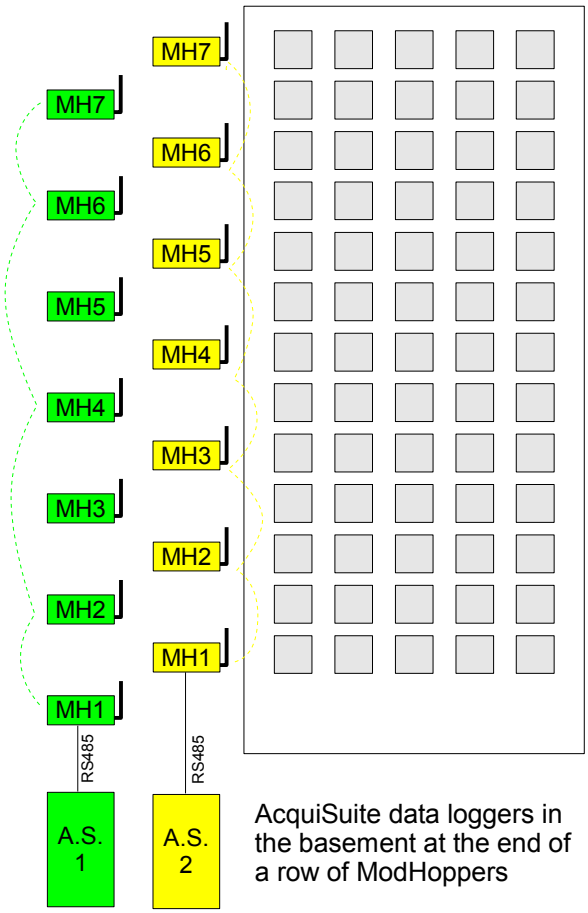
Technote 31: Optimal ModHopper placement in high-rise buildings

High-rise office buildings offer unique challenges for RF devices. Typical construction consists of a corrugated steel plate with several inches of reinforced concrete. Both concrete and steel are good at absorbing RF energy and will limit the number of floors a ModHopper may transmit through. The best plan for ModHopper placement is to minimize the number of floors that the system must transmit through from the Modbus master device to the furthest remote ModHopper.

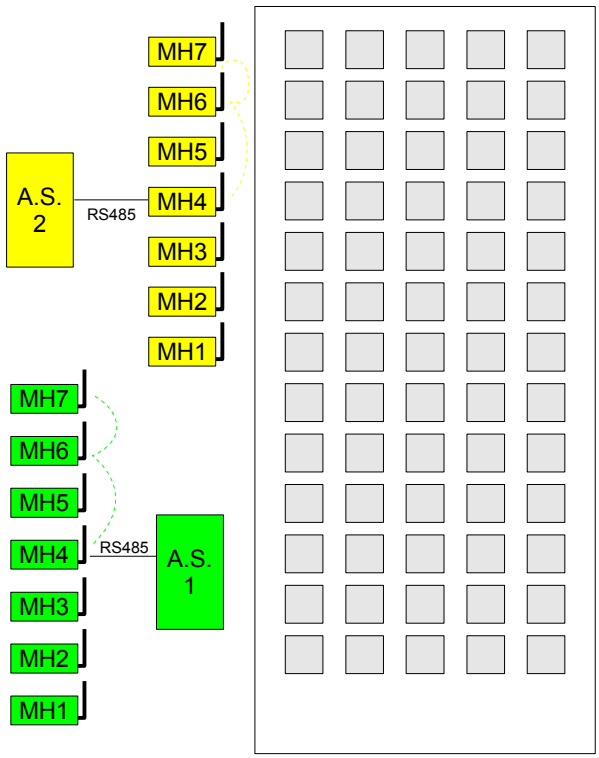
Poor Design



AcquiSuite data loggers in the basement at the end of a row of ModHoppers

Green ModHoppers on RF Channel 1
Yellow ModHoppers on RF Channel 2

Good Design



AcquiSuite data loggers in center of ModHopper clusters on 4th and 11th floors

Green ModHoppers on RF Channel 1
Yellow ModHoppers on RF Channel 2

In the first example, the system is not optimized. Each hop through the ModHopper network must pass through two floors, and the first and last ModHoppers are as far apart as possible in the building. The RF path may need to hop 4 to 7 times between ModHoppers to get from the basement to the top floor, and all 13 floors must be traversed to reach device 7.

In the second example, the system has been optimized to reduce the number of hops to 2 or 3, and the worst case transmission path has been reduced to only 3 floors. By placing the Modbus master device (AcquiSuite) in the middle of the group of ModHoppers, the maximum number of hops to the remote devices is cut in half.

Another advantage of splitting up the clusters of ModHoppers rather than having two overlapping groups is that the RF crosstalk interference between RF channels is minimized. In the first example, each ModHopper is exposed to additional RF transmissions in adjacent RF channels. In the second example, only yellow 1 & 2 would typically experience interference from green 6 & 7.

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Revised Oct 2, 2009