PART 1 - GENERAL

1.1 SUMMARY

A. Section describes a complete microprocessor controlled BACnet or LonMark compatible control and monitoring network for the various systems. On the Stanford Controls System Architecture drawing (MC-01), this network is designated as Local Controller Network. This network will connect the following systems:
   1. Air Handlers
   2. Air Terminals
   3. Fan Coil Units
   4. Pumps
   5. Heat Exchangers
   6. Air Conditioners
   7. Heaters

B. The Control and Monitoring Network shall integrate for monitoring to the following systems: (intent is for network communication)
   1. Variable Frequency Drives (hardwired for control)
   2. Lighting (occupancy to be shared)
   3. Fire Alarm (secondary monitoring of HVAC shutdown by fire alarm system)
   4. Other BAS
   5. Emergency Power (hardwired)

Note: Coordinate all other trades (prior to bid) to insure all aspect of integration are accounted for. Consultant should carefully consider all levels of integration. Edit to actual scope. Basis of Design (BOD) to define project scope. Consultant to consult with Stanford for DDC and Delta V scope reference to 25 0000.

C. Related Sections
   1. 25 00 00 Integrated Automation
   2. 25 12 19 Integration Protocols
   3. 25 12 23 Client-Server Information Database Integration
   4. 25 14 00 Local Control Units

1.2 REFERENCES

A. Stanford Network Architecture drawing (MC-01)
B. Refer to 25 0000 Integrated Automation

1.3 DEFINITIONS

A. Refer to 25 06 11 Integrated Automation Definitions

1.4 SYSTEM DESCRIPTION

A. Provide all network cabling, routers and hubs required to provide a fully functional network.
B. The system shall be modular in nature and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, controllers, and operator interface devices
C. System architectural design shall minimize dependence upon any single device for alarm reporting and control execution. Each Controller shall operate independently by performing its own specified control, input-output and associated alarms. The failure of any single controller shall not interrupt the execution of control strategies at other operational controllers.

D. Controllers shall be able to access any data from, or send control commands directly to, any other Controller or combination of controllers on the network without dependence upon a central processing device.

1.5 QUALITY ASSURANCE
A. Refer to 25 00 00 Integrated Automation
B. Conformance to loading criteria on network
C. Conform to UL 916.

PART 2 - PRODUCTS

2.1 NETWORK ARCHITECTURE
A. Refer to 25 00 00 Integrated Automation
B. Refer to 25 12 19 Integration Protocols
C. Provide complete communication architecture for devices as well as other integrated vendor devices.
D. Provide device programming capabilities via tools specified under 25 15 16.

2.2 UNMANAGED SWITCHES
A. Molex Brad model number DRL-250P, or approved equal.
B. Switch Functionality – Unmanaged
C. Mounting Style – DIN Rail
D. Temperature Range – (-10 C to +60 C)
E. Protocol – Ethernet (IEEE 802.3)

PART 3 - EXECUTION

3.1 INSTALLATION
A. Provide system to monitor and/or control devices.
B. Connect to 3rd party equipment per network diagram.
C. Provide and coordinate all points for inclusion in database generation per section 25 12 23.
D. Each Lon and BACnet segment shall be designed to utilize less than 50% of segment bandwidth. Prior to project acceptance, Owner’s Representative shall utilize a LonScanner or BACnet protocol analyzer to measure all LON and BACnet network segments. Any network segment with an Average Bandwidth Utilization that exceeds 50% in any 15 minute time period shall not be acceptable. At no additional cost to Owner, the Contractor shall reconfigure the network as required to achieve an Average Bandwidth Utilization that is less than 50%.
E. All Devices on each Lon and BACnet segment shall have a display name that exactly matches the device name. Display name mapping of any device shall not be acceptable.
3.2 NETWORK ARCHITECTURE

A. Coordinate all network communication and low voltage power requirements with appropriate contractor including the installation of cabling, and overall communication system architecture, signal quality, attenuation, power level or special needs of the control system.

B. Building level controls network shall be provided by controls contractor based on approved network drawing submittal.

C. Each individual IP-based Primary Equipment Controller (as defined in Section 25 14 00, Local Control Units) requires one Stanford-furnished Telecommunications Service Outlet (TSO). Daisy-chaining of IP-based Primary Equipment Controllers is not acceptable.

D. Generate Alarm on loss of communications.

3.3 UNMANAGED SWITCHES

A. Use of stand-alone Unmanaged Switches for IP daisy-chaining is not acceptable.

B. Unmanaged Switches may only be applied to provide an "extra" IP port for direct field connection to a Building Level Controller for troubleshooting purposes. Failure of an Unmanaged Switch shall not cause a Building Level Controller or Local Control Unit to go offline.

END OF SECTION