UNION COUNTY PUBLIC SCHOOLS

Direct Digital Controls Upgrade

Western Union Elementary School

1-9738422A

Schneider Electric

UNION COUNTY BOARD OF EDUCATION CONTRACT
WESTERN UNION ELEMENTARY SCHOOL
DIRECT DIGITAL CONTROLS UPGRADE

This Contract for Direct Digital Controls (DDC) Upgrade at Western Union Elementary School (this "Contract") is made and entered into the 2nd day of November, 2010 between The Union County Board of Education (UCBOE), administering the Union County Public Schools (UCPS), located at 400 North Church Street, Monroe, North Carolina 28112 and Schneider Electric located at 7575 Westwinds Boulevard, Suite C, Concord, NC 28027; hereby, known as Schneider Electric, or Contractor for and in consideration of the mutual promises set forth in this Contract, the parties do mutually agree as follows:

I. Obligations of Contractor. The Contractor agrees to furnish all equipment, labor, materials and supervision necessary to complete the Scope of Work identified in Attachment B.

A. Contractor shall repair and restore to its original condition any material or surface damaged by its operations.
B. Contractor shall fulfill the requirements listed within the UCPS Certification Form (Attachment C), sign and return with invoice.
C. Contractor shall complete the NC Sales and Use Tax Certification Form (Attachment D) and return with invoice.
D. Contractor shall receive prior approval by the UCPS Purchasing and Contract Coordinator for all subcontractors.
E. Contractor and all Subcontractors shall be properly licensed in the state of North Carolina for a work being performed on Union County Public School's property. Evidence of this license shall be presented with 24 hours of request.
F. All representatives of Contractor shall dress appropriately for school environment and perform work in a professional manner. Failure to comply with this requirement could result in the representative being forced to leave the Owner's property. The determination of compliance will be the sole discretion of Union County Public Schools.
G. Union County Public Schools are tobacco free. All Contractors must agree to refrain from tobacco use while on school property.
H. Contractor shall provide daily cleanup and remove all debris off UCPS property. (UCPS Dumpsters not to be used).
I. Contractor is responsible for a turn-key project.

II. Warranty.

A. Contractor shall provide the warranty as stated within Attachment B (see IFB 1-9738422A, Part 6).
B. Contractor shall transfer manufacturer's warranty to Union County Public Schools.
C. All repairs shall be performed at no cost to UCPS. This includes, but not limited to, equipment, material, labor, supervision, travel.
D. The warranty period begins upon date of acceptance by UCPS.

III. Commencement Date.

A. Contractor may proceed upon receipt of purchase order and must be completed within 120 consecutive calendar days.
B. Contractor may work on business days during the hours of 8:00 am through 8:00 pm providing no disruption to school's activities. All work shall be coordinated with the assigned Project Coordinator for UCPS.

UNION COUNTY BOARD OF EDUCATION CONTRACT
WESTERN UNION ELEMENTARY SCHOOL
DIRECT DIGITAL CONTROLS UPGRADE

IV. Damages.

A. Liquidated Damages. The damages that UCPS will encounter if job is not completed by the time specified in Attachment B, will allow liquidated damaged (not penalty) of $500.00 per day until date of completion. Completion means the Contractor has fulfilled the scope of work and requirements pertaining to this project and has received approval of Union County Public Schools. Extended time must be requested in writing to the Purchasing and Contracting Coordinator for Union County Public Schools listed herein.

B. Property Damages. Contractor is responsible for all damages to Union County Public School's Property. Immediately upon recognition of such damage, the contractor shall contact the UCPS Project Coordinator listed herein and also provide documentation of damage to the Purchasing and Contract Coordinator for Union County Public Schools.

C. Change Orders. Contractor shall submit change order requests to the Purchasing and Contract Coordinator for Union County Public Schools.

V. Obligations of UCBOE. The UCBOE agrees:

A. For all services provided above, Contractor will be paid a total of $127,302.00, subject to additions and deductions by approved Change Orders. All invoices received will be on net 30 terms. Attached to the final invoice shall be the signed copy of Union County Public School's Certification Form (Attachment C) and the required documentation listed within the scope of work (Attachment B). All submitted invoices shall have the completed NC Sales and Use Tax Certification Form (Attachment D). Failure to submit these documents with invoice may delay payment.

B. Contractor may submit invoices on a monthly basis for work completed minus 5% retainage until 50% completion.

C. The terms and conditions stated in this contract governs all other terms and conditions.

VI. Project Coordinators

The coordinators must be able to fluently speak and read the English language and shall be the sole contact during this project. Any substitutions shall be in writing with an advance notification of the new Project Coordinator's name and contact information.

A. Tony Wentz is designated as the Project Coordinator for UCBOE.
Telephone 704.296.3160 ext. 810.

B. Jeff Berry is designated as the Project Coordinator for Schneider Electric and is fully authorized to act on behalf of the Contractor in connection with this Contract.
Telephone 704.363.1217.

C. Penny Helms is designated as the Purchasing and Contract Coordinator for UCBOE.
Telephone 704-296-3160 ext 893.

UNION COUNTY BOARD OF EDUCATION CONTRACT
WESTERN UNION ELEMENTARY SCHOOL
DIRECT DIGITAL CONTROLS UPGRADE

VII. Indemnity and Insurance Requirements. The Contractor shall indemnify and hold harmless UCBOE, its officers, agents, employees and assigns from and against all claims, losses, costs, damages, expenses, attorneys' fees and liability that any of them may sustain (a) arising out of the Contractor's failure to comply with any applicable law, ordinance, regulation, or industry standard or (b) arising directly or indirectly out of the Contractor's performance or lack of performance of the terms and conditions of this Contract.

The Contractor certifies that it currently has and agrees to purchase and maintain during its performance under this Contract the following insurance from one or more insurance companies acceptable to UCBOE and authorized to do business in the State of North Carolina:

Automobile – The Contractor shall maintain bodily injury and property damage liability insurance covering all owned, non-owned and hired automobiles. If the Contractor is not an individual, the policy limits of such insurance shall not be less than $1,000,000 combined single limit each person/each occurrence. If the Contractor is an individual, the policy limits of such insurance shall not be less than a combined single limit of $100,000 each person/$300,000 each accident – bodily injury/$50,000 each accident – property damage.

Commercial General Liability - The Contractor shall maintain commercial general liability insurance that shall protect the Contractor from claims of bodily injury or property damage which arise from performance under this Contract. This insurance shall include coverage for contractual liability. If the Contractor is not an individual, the policy limits of such insurance shall not be less than $1,000,000 combined single limit each occurrence/annual aggregate. If the Contractor is an individual, the policy limits of such insurance shall not be less than $300,000 combined single limit each occurrence/annual aggregate.

Worker's Compensation and Employers' Liability Insurance - If applicable to the Contractor, the Contractor shall meet the statutory requirements of the State of North Carolina for worker's compensation coverage and employers' liability insurance.

The Contractor shall also provide any other insurance specifically recommended in writing by the Department of Insurance and Risk Management. **The Contractor shall list Union County Board of Education as an additional Insured under the GL and AL policies as respects to work performed.**

Certificates of such insurance shall be furnished by the Contractor to UCBOE and shall contain the provision that UCBOE be given 30 days' written notice of any intent to amend or terminate by either the Contractor or the insuring company.

Failure to furnish insurance certificates or to maintain such insurance shall be a default under this Contract and shall be grounds for immediate termination of this Contract.

Additional Provisions. Contractor agrees to the Standard Terms and Conditions set forth as Attachment A attached hereto and incorporated herein by reference.

UNION COUNTY BOARD OF EDUCATION CONTRACT
WESTERN UNION ELEMENTARY SCHOOL
DIRECT DIGITAL CONTROLS UPGRADE

IN WITNESS WHEREOF, UCBOE and the Contractor have executed this Contract on the day and year first written above.

SCHNEIDER ELECTRIC

By: _____

Title: _____

Date

Contractor's Federal Identification # [if Contract is with Organization] or Social Security Number [if Contract is with individual]

_____ 11/9/10
Chairman of UCBOE Date

This instrument has been preaudited in the manner required by the School Budget and Fiscal Control Act.

_____ 10/21/10
Finance Officer Date

_____
Division of Insurance\ & Risk Management Date

_____
UCBOE Attorney Date

UNION COUNTY BOARD OF EDUCATION CONTRACT
WESTERN UNION ELEMENTARY SCHOOL
DIRECT DIGITAL CONTROLS UPGRADE

IN WITNESS WHEREOF, UCBOE and the Contractor have executed this Contract on the day and year first written above.

SCHNEIDER ELECTRIC

By: _____

Title: _____

Date

Contractor's Federal Identification # [if Contract is with Organization]

or Social Security Number [if Contract is with individual]

Chairman of UCBOE Date

This instrument has been preaudited in the manner required by the School Budget and Fiscal Control Act.

Finance Officer Date

Division of Insurance\ & Risk Management Date

Michael R. Deaton 10/26/10

UCBOE Attorney Date

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 08/12/2010

PRODUCER
MARSH USA INC.
99 HIGH STREET
BOSTON, MA 02110
Attn: Boston.CertRequest@marsh.com/ Fax: 212.948.4377

838732-TAC A-GAWU-10-11 DTERL

INSURED
SCHNEIDER ELECTRIC BUILDINGS AMERICAS,
INC. (FORMERLY TAC AMERICAS, INC.)
1650 WEST CROSBY ROAD
CARROLLTON, TX 75006

THIS CERTIFICATION IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A: New Hampshire Insurance Company	23841
INSURER B: Lexington Insurance Company	19437
INSURER C: National Union Fire Insurance Company	19445
INSURER D:	
INSURER E:	

COVERAGES 1

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS	
A		**GENERAL LIABILITY** [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR GENERAL AGGREGATE LIMIT APPLIES PER [ ] POLICY [X] PRO-JECT [ ] LOC	7146032	01/01/2010	01/01/2011	EACH OCCURRENCE DAMAGE TO RENTED PREMISES(Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 5,000,000 $ 5,000,000 $ 5,000 $ 5,000,000 $ 5,000,000 $ 5,000,000
A A A B		**AUTOMOBILE LIABILITY** [X] ANY AUTO [ ] ALL OWNED AUTOS [ ] SCHEDULED AUTOS [ ] HIRED AUTOS [ ] NON-OWNED AUTOS	6647413 (AOS) 6647411 (MA) 6647412 (VA) 6647410 Physical Damage (AOS)	01/01/2010 01/01/2010 01/01/2010 01/01/2010	01/01/2011 01/01/2011 01/01/2011 01/01/2011	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 5,000,000 $ $ $
		GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN AUTO ONLY: EA ACC AGG	$ $ $
C		**EXCESS / UMBRELLA LIABILITY** [X] OCCUR [ ] CLAIMS MADE [ ] DEDUCTIBLE [ ] RETENTION $	27471646	01/01/2010	01/01/2011	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
A A		**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [N] (Mandatory in NH) If yes, describe under SPECIAL PROVISIONS below	WC 060169658 (TX) WC 060169656 (CA)	01/01/2010 01/01/2010	01/01/2011 01/01/2011	[X] WC STATU-TORY LIMITS [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 5,000,000 $ 5,000,000 $ 5,000,000
B		**OTHER** PROFESSIONAL LIABILITY	7146043	01/01/2010	01/01/2011	EACH CLAIM AGGREGATE	5,000,000 5,000,000

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS
UNION COUNTY PUBLIC SCHOOLS IS INCLUDED AS ADDITIONAL INSURED WITH RESPECT TO GENERAL AND AUTO LIABILITY PURSUANT TO POLICY TERMS AND CONDITIONS. EXCESS LIABILITY IS FOLLOW FORM.

CERTIFICATE HOLDER NYC-004238067-01

Union County Public Schools
Attn: Penny Helms Purchasing & Contract Dept.
201 Venus Street
Monroe, NC 28112

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE of Marsh USA Inc.
Edward R Ford

Edward R. Ford

IMPORTANT

If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

DISCLAIMER

This Certificate of Insurance does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder, nor does it affirmatively or negatively amend, extend or alter the coverage afforded by the policies listed thereon.

ADDITIONAL INFORMATION

NYC-004238067-01

DATE (MM/DD/YY)
08/12/2010

PRODUCER

MARSH USA INC.
99 HIGH STREET
BOSTON, MA 02110
Attn: Boston.CertRequest@marsh.com/ Fax: 212.948.4377

838732-TAC A-GAWU-10-11 DTERL

INSURERS AFFORDING COVERAGE	NAIC #
INSURER F:	
INSURER G:	
INSURER H:	
INSURER I:	

INSURED

SCHNEIDER ELECTRIC BUILDINGS AMERICAS,
INC. (FORMERLY TAC AMERICAS, INC.)
1650 WEST CROSBY ROAD
CARROLLTON, TX 75006

TEXT

ADDITIONAL NAMED INSURED INCLUDES THE FOLLOWING:

SCHNEIDER ELECTRIC BUILDINGS CRITICAL SYSTEMS, INC. (FORMERLY TAC-CRITICAL SYSTEMS, INC.)

ADDITIONAL POLICIES:

WORKERS COMPENSATION: 01/01/10 - 01/01/11

WC 060169659 (OR) - New Hampshire Insurance Company
WC 060169660 (MA,MN,NV,NY,WI) - New Hampshire Insurance Company
WC 060169661 (AL, AZ, CO,DE,IA,ID,ME, MI,MT,NE,NH,NJ, RI,UT,VT, WV) - New Hampshire Insurance Company
WC 060169662 (AOS) - Chartis Casualty Company
WC 060169657 (FL) - New Hampshire Insurance Company

OHIO ONLY EXCESS WORKERS COMP: 01/01/10 - 01/01/11
0910547- ILLINOIS NATIONAL INSURANCE COMPANY
EMPLOYERS LIABILITY

EACH ACCIDENT:	$4,000,000
DISEASE-POLICY LIMIT:	$4,000,000
DISEASE-EACH EMPLOYEE:	$4,000,000
SELF-INSURED RETENTION:	$1,000,000

CONTRACTORS PROFESSIONAL AND POLLUTION LIABILITY: 01/01/10 - 01/01/11
029210526 - LEXINGTON INSURANCE COMPANY
EACH CLAIM: $5,000,000
AGGREGATE: $5,000,000
SIR: $500,000

CERTIFICATE HOLDER

Union County Public Schools
Attn: Penny Helms Purchasing & Contract Dept.
201 Venus Street
Monroe, NC 28112

AUTHORIZED REPRESENTATIVE
of Marsh USA Inc.
Edward R Ford

Edward R. Ford

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we, **Schneider Electric Buildings Americas, Inc. – 7575 West Winds Blvd., Ste C, Concord, NC 28027** (Here insert full name and address or legal title of Contractor) ,as Principal, hereinafter called the Principal, and **Liberty Mutual Insurance Company 175 Berkley Street, Boston, MA 02116**

(Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of **South Dakota** as Surety, hereinafter called the Surety, are held and firmly bound unto **Union County Public Schools – 201 Venus Street, Monroe, NC 28112**

(Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called the Obligee, in the sum of **Five Percent of Amount Bid** ----Dollars **($5% of A.B.),**

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for:

(Here insert full name, address and description of project)

Replace the existing control system with a new DDC control system for Union County Public Schools, Monroe, NC

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

The Obligee, in accepting the Principal's proposal, bid, and/or bid bond, acknowledges and agrees that the Surety has no obligation to issue a performance and payment bond that guarantees the performance of (i) any efficiency or energy savings guarantees or (ii) any other guarantees or warranties with terms beyond one (1) year in duration.

Signed and sealed this **4th** Day of **October** **2010**

(Witness)

(Witness)

Schneider Electric Buildings Americas, Inc.

(Principal) (Seal)

By: (Title) Accountant

Liberty Mutual Insurance Company

(Surety) (Seal)

By: (Title)

Sandra Nowakowski, Attorney-in-Fact

2888824

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

LIBERTY MUTUAL INSURANCE COMPANY
BOSTON, MASSACHUSETTS
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Liberty Mutual Insurance Company (the "Company"), a Massachusetts stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint

RALPH E. NOSAL, THEODORE C. SEVIER, JR., C. R. HERNANDEZ, SANDRA NOWAKOWSKI, KATHERINE J. FOREIT, LINH B. BUCHOLTZ, DAVID J. ROTH, BEATRIZ POLITO, ALL OF THE CITY OF CHICAGO, STATE OF ILLINOIS ....

, each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations in the penal sum not exceeding **TWENTY FIVE MILLION AND 00/100********** DOLLARS ($ **25,000,000.00**********) each, and the execution of such undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents, shall be as binding upon the Company as if they had been duly signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

By the following instrument the chairman or the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article XIII, Section 5 of the By-Laws, Garnet W. Elliott, Assistant Secretary of Liberty Mutual Insurance Company, is hereby authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

That the By-law and the Authorization set forth above are true copies thereof and are now in full force and effect.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of Liberty Mutual Insurance Company has been affixed thereto in Plymouth Meeting, Pennsylvania this 5th day of May, 2010.

LIBERTY MUTUAL INSURANCE COMPANY

By Garnet W. Elliott
Garnet W. Elliott, Assistant Secretary

COMMONWEALTH OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 5th day of May, 2010, before me, a Notary Public, personally came Garnet W. Elliott, to me known, and acknowledged that he is an Assistant Secretary of Liberty Mutual Insurance Company; that he knows the seal of said corporation; and that he executed the above Power of Attorney and affixed the corporate seal of Liberty Mutual Insurance Company thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.

TERESA PASTELLA COMMONWEALTH OF PENNSYLVANIA NOTARY PUBLIC

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Plymouth Twp., Montgomery County
My Commission Expires March 28, 2013
Member, Pennsylvania Association of Notaries

By Teresa Pastella
Teresa Pastella, Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the officer or official who executed the said power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article XIII, Section 5 of the By-laws of Liberty Mutual Insurance Company.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Liberty Mutual Insurance Company at a meeting duly called and held on the 12th day of March, 1980.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, wherever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 4 day of October, 2010.

By David M. Carey
David M. Carey, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call 1-610-832-8240 between 9:00 am and 4:30 pm EST on any business day.

STATE OF ILLINOIS
COUNTY OF COOK

I, **Katherine J. Foreit**, a Notary Public in and for said County, do hereby

certify that **Sandra Nowakowski** Attorney-in-Fact, of the

Liberty Mutual Insurance Company	**Massachusetts Corporation**

who is personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that they signed, sealed, and delivered said instrument for and on behalf of:

Liberty Mutual Insurance Company	**Massachusetts Corporation**

for the uses and purposed therein set forth.

Given under my hand and notarial seal at my office in the City of **Chicago** in said County, this 4 day of October 2010 **A.D.**

Katherine J Foreit
Notary Public

"OFFICIAL SEAL"
KATHERINE J. FOREIT
NOTARY PUBLIC, STATE OF ILLINOIS
My Commission Expires 08/10/2013

Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid Attach to Bid

State of North Carolina AFFIDAVIT A - Listing of Good Faith Efforts

County of Gaston

(Name of Bidder)

Affidavit of SCHNEIDER ELECTRIC

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ☒ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ☒ **2 –(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ☒ **3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ☐ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ☐ **5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- ☐ **6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ☒ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ☐ **8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ☐ **9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ☐ **10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: 9/29/10 Name of Authorized Officer: [signature]

Signature: GERALD A. BLACKMORE

Title: V.P.

ROSEMARY H MARTIN NOTARY PUBLIC My Comm. Exp. 12/29/2014 SEAL GASTON COUNTY, N.C.

State of North Carolina, County of Gaston

Subscribed and sworn to before me this 29th day of Sept 2010

Notary Public Rosemary H Martin

My commission expires 12/29/2014

CONTRACTOR INFORMATION

Firm Name: Schneider Electric

Address: 7575 Westwind Blvd Concord, NC 28027

Telephone Number: 704-634-1685

Ownership Category: *(Please Circle One)*

(Non-Minority)	Black	Hispanic
Asian-American	American Indian	White Female
Socially and Economically Disadvantaged		

Ownership is Minority Female: YES (NO) *(Please Circle One)*

Source of Ownership Category: *(Please Circle One)*

Non-Applicable	State of NC HUB
State of NC DOT	Local Agency
Federal Agency	(Out of State Agency)
Self-Identified	Unknown

Primary Type of Work: *(Please Circle One)*

Concrete	Conveying System
Door and Windows	Electrical
Equipment	Finishes
Furnishings	General Construction
Masonry	General Requirements
(Mechanical)	Metals
Plumbing	Site Construction
Specialties	Special Construction
Wood and Plastics	Thermal and Moisture Protection

Quote: _____

Project Square Footage: _____

SUBCONTRACTOR INFORMATION

Firm Name: ElectroServices INC.

Original Contract Value: 30,000

Contract Date:

Notice to Proceed:

Contract Completion Date: 120 days

Ownership Category:
(Please Circle One)

Non-Minority	Black	Hispanic
Asian-American	American Indian	White Female
Socially and Economically Disadvantaged		

Ownership is Minority Female: YES (NO)
(Please Circle One)

Source of Ownership Category:
(Please Circle One)

Non-Applicable	State of NC HUB
State of NC DOT	Local Agency
Federal Agency	Out of State Agency
Self-Identified	Unknown

Primary Type of Work:
(Please Circle One)

Concrete	Conveying System
Door and Windows	(Electrical)
Equipment	Finishes
Furnishings	General Construction
Masonry	General Requirements
Mechanical	Metals
Plumbing	Site Construction
Specialties	Special Construction
Wood and Plastics	Thermal and Moisture Protection

Quote:

SUBCONTRACTOR INFORMATION

Firm Name: Superior Mechanical Systems INC.

Original Contract Value: 11,000

Contract Date: _____

Notice to Proceed: _____

Contract Completion Date: _____

Ownership Category:
(Please Circle One)

Non-Minority	(Black)	Hispanic
Asian-American	American Indian	White Female
Socially and Economically Disadvantaged		

Ownership is Minority Female: YES (NO)
(Please Circle One)

Source of Ownership Category:
(Please Circle One)

Non-Applicable	State of NC HUB
State of NC DOT	Local Agency
Federal Agency	Out of State Agency
Self-Identified	Unknown

Primary Type of Work:
(Please Circle One)

Concrete	Conveying System
Door and Windows	Electrical
Equipment	Finishes
Furnishings	General Construction
Masonry	General Requirements
(Mechanical)	Metals
Plumbing	Site Construction
Specialties	Special Construction
Wood and Plastics	Thermal and Moisture Protection

Quote: _____

UNION COUNTY BOARD OF EDUCATION CONTRACT
WESTERN UNION ELEMENTARY SCHOOL
DIRECT DIGITAL CONTROLS UPGRADE

ATTACHMENT A
STANDARD TERMS AND CONDITIONS

1. Termination for Convenience. UCBOE may terminate this Contract at any time at its complete discretion by 30 days notice in writing from the UCBOE to the Contractor. If the Contract is terminated by the UCBOE in accordance with this paragraph, the Contractor will be paid in an amount which bears the same ratio to the total compensation as does the service actually performed to the total service originally contemplated in this Contract.

2. Termination for Default.
   If Contractor fails to perform its obligations timely and in conformance with the requirements of this contract, UCBOE shall give Contractor written notice of the default and intent to terminate if the default is not cured within 15 calendar days to the satisfaction of UCBOE.

   All finished or unfinished deliverable items under this contract prepared by the Contractor shall become the property of UCBOE, and the Contractor shall be entitled to receive payment for any satisfactory work completed on such materials. Notwithstanding, the Contractor shall not be relieved of liability to UCBOE for damages sustained by UCBOE by virtue of any breach of the agreement, and UCBOE may withhold any payment due the Contractor for the purpose of setoff until such time as the breach is cured or the exact amount of damages due UCBOE from such breach can be determined.

   In case of default by the Contractor, UCBOE may procure the services from other sources and hold the Contractor responsible for any excess cost incurred.

   Upon the entering of a judgment of bankruptcy of insolvency by or against the Contractor, UCBOE may terminate this contract for cause.

3. Contract Funding. It is understood and agreed between the Contractor and the UCBOE that the UCBOE's obligation under this Contract is contingent upon the availability of appropriated funds from which payment for Contract purposes can be made. The execution of this contract by UCBOE is assurance that sufficient funds have been appropriated for the current fiscal year budget. Should such funds not be appropriated or allocated, this Contract may be immediately terminated by either party. UCBOE shall give prompt written notice to the Contractor if funds are not available. The UCBOE shall not be liable to the Contractor for damages of any kind (general, special, or exemplary) as a result of such termination.

4. Accounting Procedures. The Contractor shall comply with accounting and fiscal management procedures prescribed by the UCBOE to apply to this Contract. The Contractor shall assure such fiscal control and accounting procedures as may be necessary for proper disbursement of and accounting for all project funds. The Contractor shall assure that all funds received by it pursuant to this Contract will be used only to support the cost of those activities described in this Contract.

5. Improper Payments. The Contractor shall assume all risks attendant to any improper expenditure of funds under this Contract. The Contractor shall refund to the UCBOE any payment made pursuant to this Contract if it is subsequently determined by audit that such payment was improper under any applicable law, regulation or procedure. The Contractor shall make such refunds within 30 days after the UCBOE notifies the Contractor in writing that a payment has been determined to be improper.

6. Contract Transfer. The Contractor shall not assign, subcontract or otherwise transfer any interest in this Contract without the prior written approval of the UCBOE.
7. Contract Personnel. The Contractor agrees that it has, or will secure at its own expense, all personnel required to perform the services set forth in this Contract.

8. Key Personnel. The Contractor shall not substitute for key personnel assigned to the performance of this Contract without prior written approval from the UCBOE Project Coordinator. "Key personnel" are defined as those individuals identified by name or title in this Contract or in written communication from the Contractor.

9. Contract Modifications: This contract may be amended only by written amendment duly executed by both the UCBOE and the Contractor.

10. Relationship of Parties. The Contractor is an independent contractor and not an employee of the UCBOE. The conduct and control of the work will lie solely with the Contractor. This Contract shall not be construed as establishing a joint venture, partnership or any principal-agent relationship for any purpose between the Contractor and the UCBOE. Employees of the Contractor shall remain subject to the exclusive control and supervision of the Contractor, which is solely responsible for their compensation.

11. Advertisement. The Contract will not be used in connection with any advertising by the Contractor without prior written approval by the UCBOE.

12. Nondiscrimination. During the performance of this Contract, the Contractor shall not discriminate against or deny the Contract's benefits to any person on the basis of sexual orientation, national origin, race, ethnic background, color, religion, gender, age or disability.

13. Conflict of Interest. The Contractor represents and warrants that no member of the UCBOE or any of its employees or officers has a personal or financial interest or will benefit from the performance of this Contract or has any interest in any Contract, subcontract or other agreement related to this Contract. Contractor shall not permit any member of the UCBOE or any of its employees or officers to obtain a personal or financial interest or benefit from the performance of this Contract or to have any interest in any Contract, subcontract or other agreement related to this Contract, during the term of this Contract. The Contractor shall cause this paragraph to be included in all Contracts, subcontracts and other agreements related to this Contract.

14. Gratuities to UCBOE. The right of the Contractor to proceed may be terminated by written notice if the UCBOE determines that the Contractor, its agent or another representative offered or gave a gratuity to an official or employee of the UCBOE in violation of policies of the UCBOE.

15. Kickbacks to Contractor. The Contractor shall not permit any kickbacks or gratuities to be provided, directly or indirectly, to itself, its employees, subcontractors or subcontractor employees for the purpose of improperly obtaining or rewarding favorable treatment in connection with a UCBOE Contract or in connection with a subcontract relating to a UCBOE Contract. When the Contractor has grounds to believe that a violation of this clause may have occurred, the Contractor shall promptly report to the UCBOE in writing the possible violation.

16. Monitoring and Evaluation. The Contractor shall cooperate with the UCBOE, or with any other person or agency as directed by the UCBOE, in monitoring, inspecting, auditing or investigating activities related to this Contract. The Contractor shall permit the UCBOE to evaluate all activities conducted under this Contract. UCBOE has the right at its sole discretion to require that Contractor remove any employee of Contractor from UCBOE property and from performing services under this Contract following provision of notice to Contractor of the reasons for UCBOE's dissatisfaction with the services of Contractor's employee.

17. Financial Responsibility. The Contractor is financially solvent and able to perform under this Contract. If requested by the UCBOE, the Contractor agrees to provide a copy of its latest audited annual financial statements or other financial statements as deemed acceptable by the UCBOE's Finance Officer.

18. Dispute Resolution. At the option of the parties, disputes may be resolved by any method of ADR to which the parties agree in writing, including, but not limited to:

    (a) Mediation, pursuant to NCGS 7A-38.1 or the American Arbitration Association Mediation, or by written agreement of the parties.
    (b) Arbitration: pursuant to The Uniform Arbitration Act (NCGS 1-567.1 et seq.)
    (c) The award rendered by the arbitrator or arbitrators shall be final unless a party thereto gives written notice of its objection to the final award by arbitration within twenty (20) days from receipt of said decision. Upon giving of said notice the party objecting thereto may file suit concerning the dispute as if arbitration had never occurred. Unless legally required to do otherwise, the parties agree not to refer to the arbitration in the filing of any lawsuit or during its subsequent litigation, or to submit to the court any record of information concerning the arbitration.

19. No Third Party Benefits. This Contract shall not be considered by the Contractor to create any benefits on behalf of any third party. The Contractor shall include in all contracts, subcontracts or other agreements relating to this Contract an acknowledgment by the contracting parties that this Contract creates no third party benefits.

20. Confidentiality of Student Information. If, during the course of the Contractor's performance of this Contract, the Contractor should obtain any information pertaining to the students' official records, the Contractor agrees to keep any such information confidential and to not disclose or permit to be disclosed, directly or indirectly, to any person or entity any such student information. This Contract shall not be construed by either party to constitute a waiver of or to in any manner diminish the provisions for confidentiality of students' records. Additionally, pursuant to N.C.G.S. 115C-401.1, Prohibition on the Disclosure of Information about Students, it is unlawful for a person who enters into a contract with a local board of education to sell personally identifiable information that is obtained from a student as a result of that person's performance under the contract.

21. Background Checks. At the request of UCBOE's Project Coordinator, the Contractor (if an individual) or any individual employees of the Contractor shall submit to UCBOE criminal background check and drug testing procedures.

22. Jessica Lunsford Act. "Contractors, subcontractors, consultants, sub-consultants, and vendors shall annually conduct a review of the State Sex Offender and Public Protection Registration Program, the State Sexually Violent Predator Registration Program, and the National Sex Offender Registry for all employees who will provide services under this contract. Any employee of the contractor, subcontractor, consultant, sub-consultant, or vendor found to be registered on any of the lists identified herein shall not perform any work under this contract and shall not be permitted to enter property owned by Union County Public Schools or Union County on behalf of Union County Public Schools. Failure to comply may result in legal action and termination of the contract for default."

23. Force Majeure. If UCBOE is unable to perform its obligations or to accept the services or goods because of Force Majeure (as hereinafter defined), the time for such performance by UCBOE or acceptance of services will be equitably adjusted by allowing additional time for performance or acceptance of services equal to any periods of Force Majeure. "Force Majeure" shall mean any

delays caused by acts of God, riot, war, terrorism. Inclement weather, labor strikes, material shortages and other causes beyond the reasonable control of UCBOE.

24. Ownership of Documents. All rights in the work created pursuant to this Contract are owned by the UCBOE including, but not limited to, copyright, trade or service mark and licensing rights. Upon the termination or expiration of this Contract, any and all finished or unfinished documents and other materials produced by the Contractor pursuant to this Contract shall, at the request of the UCBOE, be turned over to UCBOE. Any technical knowledge or information of Contractor which Contractor shall have disclosed or may hereafter disclose to UCBOE shall not, unless otherwise specifically agreed upon in writing by UCBOE, be deemed to be confidential or proprietary information and shall be acquired by UCBOE as part of the consideration of this Contract free from any restrictions.

25. Contract Situs. All matters, whether sounding in contract or tort relating to the validity, construction, interpretation and enforcement of this Contract, will be determined in Union County, North Carolina. North Carolina law will govern the interpretation and construction of this Contract.

26. Entire Agreement. This Contract constitutes and expresses the entire agreement and understanding between the parties concerning the subject matter of this Contract. This document (including exhibits, if any), any purchase order used in connection with this Contract and any other document expressly incorporated in this Contract by reference supersede all prior and contemporaneous discussions, promises, representations, agreements and understandings relative to the subject matter of this Contract.

ATTACHMENT B

UCPS
UNION COUNTY PUBLIC SCHOOLS

Maintenance

201 Venus Street
Monroe, NC 28112
Phone 704.296.3160 Fax 704.296.3163
www.ucps.k12.nc.us

ADDENDUM 1

PROJECT: DIRECT DIGITAL CONTROLS (DDC) UPGRADE
WESTERN UNION ELEMENTARY SCHOOL
IFB# 1-9738422

DUE DATE: **2:00 pm on Thursday, September 30, 2010**

Contractor shall fulfill all requirements listed within IFB 1-9738422 with additions and/or changes noted below:

1. The kitchen hood shall be on the energy management schedule.
2. The gymnasium restrooms radiators shall be equipped with on new control valve to serve both toilet radiators with a temperature sensor for each toilet. If either sensor call for heat, the control valve shall open.
3. All (4) gymnasium unit heaters shall be controlled by one sensor that will turns fans off and on. There is no control valve. The aquastat in the piping shall remain as is.
4. The (2) classrooms in the gymnasium served by split systems shall be controlled by room sensors and started and stopped by the energy management system schedule.
5. All group toilet exhaust fans shall be on schedule.
6. The (4) outside air units shall be tied to the energy management schedule.
7. Electric Meter will not be included.
8. Contractor shall be responsible for replacing all disturbed insulation in the project to current standards.
9. See the attached school map showing equipment quantities.

Please sign indicating that you have received and reviewed this addendum and return to fax 704-283-2371 or include within bid package.

Joe H. Kelly
Signature

Schneider Electric
Company

Will you be placing a bid on this project? (Yes) No

UCPS
UNION COUNTY PUBLIC SCHOOLS
Maintenance
201 Venus Street
Monroe, NC 28112
Phone 704.296.3160 Fax 704.296.3163
www.ucps.k12.nc.us

ADDENDUM 2

PROJECT: DIRECT DIGITAL CONTROLS (DDC) UPGRADE
WESTERN UNION ELEMENTARY SCHOOL
IFB# 1-9738422

DUE DATE: **2:00 pm on Thursday, September 30, 2010**

Clarification

1. The (4) DX outside air units have a dual temp coil as well as an electric heating coil in the duct. The DX system and each coil shall be controlled to provide neutral outside air to the space.

2. Assume that there are isolation valves at each fan coil unit and unit vent. They are shown on the drawings. Be sure to include this assumption in your bid.

Please sign indicating that you have received and reviewed this addendum and return to fax 704-283-2371 or include within bid package.

Signature

Schneider Electric
Company

Will you be placing a bid on this project? (Yes) No

UNION COUNTY PUBLIC SCHOOLS 201 VENUS STREET MONROE, NC 28112	**INVITATION FOR BIDS NO. 1-9738422A**
	Bids will be publicly opened: October 13, 2010
	Contract Type: Open Market Solicitations
Refer ALL Inquiries to: Telephone No. 704-296-3160 Ext. 893	Commodity: Direct Digital Controls (DDC) Upgrade at Western Union Elementary School
E-Mail: penny.helms@ucps.k12.nc.us	Using Agency Name: Union County Public Schools
(See page 2 for mailing instructions.)	

NOTICE TO BIDDERS

Sealed bids, subject to the conditions made a part hereof, will be received at this office (201 Venus Street, Monroe, NC 28112) until 2:00 p.m. on the day of opening and then opened, for furnishing and delivering the commodity as described herein. Refer to page 2 for proper mailing instructions.

Bids submitted via telegraph, facsimile (FAX) machine, telephone, and electronic means, including but not limited to e-mail, in response to this Invitation for Bids will not be acceptable. Bids are subject to rejection unless submitted on this form.

EXECUTION

In compliance with this Invitation for Bids, and subject to all the conditions herein, the undersigned offers and agrees to furnish and deliver any or all items upon which prices are bid, at the prices set opposite each item within the time specified herein. By executing this bid, I certify that this bid is submitted competitively and without collusion (G.S. 143-54), that none of our officers, directors, or owners of an unincorporated business entity has been convicted of any violations of Chapter 78A of the General Statutes, the Securities Act of 1933, or the Securities Exchange Act of 1934 (G.S. 143-59.2), and that we are not an ineligible vendor as set forth in G.S. 143-59.1. False certification is a Class I felony.

Failure to execute/sign bid prior to submittal shall render bid invalid. Late bids are not acceptable.

BIDDER: Schneider Electric		FEDERAL ID OR SOCIAL SECURITY NO.: 752066352	
STREET ADDRESS: 7575 Westwinds Blvd. Suite "C"		P.O. BOX:	ZIP:
CITY & STATE & ZIP: Concord, N.C. 28027		TELEPHONE NUMBER: 704.788.9196	TOLL FREE TEL. NO (800)
PRINCIPAL PLACE OF BUSINESS ADDRESS IF DIFFERENT FROM ABOVE (SEE INSTRUCTIONS TO BIDDERS ITEM #21):			
TYPE OR PRINT NAME & TITLE OF PERSON SIGNING: Joe H. Shelley		FAX NUMBER: 704.788.9170	
AUTHORIZED SIGNATURE: Joe H. Shelley	DATE: 9.30.2010	E-MAIL: Joe.Shelley@TAC.com	

Offer valid for 90 days from date of bid opening unless otherwise stated here: ____ days (See Instructions to Bidders, Item 6).
Prompt Payment Discount: _____ % _____ days (See Instructions to Bidders, Item 7).

ACCEPTANCE OF BID

If any or all parts of this bid are accepted, an authorized representative of Union County Public Schools shall affix their signature hereto and this document and the provisions of the Instructions to Bidders, special terms and conditions specific to this Invitation for Bids, the specifications, and the North Carolina General Contract Terms and Conditions shall then constitute the written agreement between the parties. A copy of this acceptance will be forwarded to the successful bidder(s).

FOR UNION COUNTY PUBLIC SCHOOLS USE ONLY

Offer accepted and contract awarded this ____ day of _____, 20____, as indicated on attached certification.

By _____ (Authorized representative of (UNION COUNTY PUBLIC SCHOOLS).

In an effort to support the sustainability efforts of the State of North Carolina we solicit your cooperation in this effort.

It is desirable that all responses meet the following requirements:

- All copies are printed **double sided**.
- All submittals and copies are printed on **recycled paper with a minimum post-consumer content of 30%** and indicate this information accordingly on the response.
- Unless absolutely necessary, all bids and copies should **minimize or eliminate use of non-recyclable or non re-usable materials** such as plastic report covers, plastic dividers, vinyl sleeves, and GBC binding. Three-ringed binders, glued materials, paper clips, and staples are acceptable.
- Materials should be submitted in a format which allows for **easy removal and recycling** of paper materials.
- **It is Mandatory that all responses shall be presented with components appearing in the order designated on Attachment A of this document.**

MAILING INSTRUCTIONS: Mail only one fully executed bid document, unless otherwise instructed, and only one bid per envelope. Address envelope and insert bid number as shown below. It is the responsibility of the bidder to have the bid in this office by the specified time and date of opening.

DELIVERED BY US POSTAL SERVICE	**DELIVERED BY ANY OTHER MEANS**
BID NO. **1-9738422** Union County Public Schools Attn: Penny Helms 201 Venus Street Monroe, NC 28112	BID NO. **1-9738422** Union County Public Schools Attn: Penny Helms 201 Venus Street Monroe, NC 28112

TABULATIONS: Tabulations may be obtained by contacting Penny Helms at 704-296-3160 ext 893 or by email penny.helms@ucps.k12.nc.us.

VENDOR REGISTRATION AND SOLICITATION NOTIFICATION SYSTEM: Vendor Link NC allows vendors to electronically register free with the State to receive electronic notification of current procurement opportunities for goods and services available on the Interactive Purchasing System. Online registration and other purchasing information are available on our Internet web site: http://www.state.nc.us/pandc/.

TRANSPORTATION CHARGES: F.O.B DESTINATION, VARIOUS LOCATIONS THROUGHOUT MONROE, NC WITH ALL TRANSPORTATION CHARGES INCLUDED IN THE ITEMS BID.

MANDATORY SITE VISIT: **A mandatory site visit will not be held.**

ATTENTION: This contract is included in e-procurement and paragraphs #19 and #20 of the North Carolina General Contract Terms and Conditions do apply. The Terms and Conditions made part of this solicitation contain new language necessary for implementation of North Carolina's Statewide e-procurement initiative.

It is the offeror's responsibility to read these terms and conditions carefully and considers them in preparing the offer. By signature offeror acknowledges acceptance of all terms and conditions, including those related to e-procurement.

General information on the e-procurement service can be found at http://eprocurement.ncgov.com

BIDDER: Schneider Electric

DELIVERY/INSTALLATION: This project must be completed within 90 consecutive calendar days after receipt of purchase order for this requirement(s). If unable to meet this requirement, please enter here the earliest date thereafter you can complete delivery/installation: 120 Union County Public Schools reserves the right to make the delivery/installation offered a factor in the award of any contract resulting from this IFB.

MAKE AND MODEL: Manufacturer's name and model/catalog numbers used are for the purpose of identification and to establish general quality level desired. Such references are not intended to be restrictive and comparable products of other manufacturers will be considered. All bidders must receive prior approval for all substitutions before bid submittal. Request to accept substitutions must be sent to Penny Helms, UCPS Purchasing and Contract at penny.helms@ucps.k12.nc.us or 704-296-3160 ext 893.

SPECIFICATIONS: The attached specifications and requirements are drawn around equipment, which Union County Public Schools has evaluated and determined that the size, construction, design layout, special features and performance are necessary. Bidders are requested to offer only equivalent comparable units that will provide the features and performance needed and implied. All bidders must receive prior approval for all substitutions before bid submittal. Request to accept substitutions must be sent to Penny Helms, UCPS Purchasing and Contract at penny.helms@ucps.k12.nc.us or 704-296-3160 ext 893.

DEMONSTRATION: Bidder must be capable of demonstrating proposed equipment within (7) consecutive calendar days after notification at no additional cost to Union County Public Schools. If required, this will be a comprehensive demonstration at a site designated by Union County Public Schools with hands-on participation by agency operator(s) if necessary. Bids which fail to comply with this requirement may be subject to rejection.

WARRANTY AND SERVICE: **A.** Unless otherwise specified, unconditionally guarantee in writing the materials, equipment, workmanship, and labor to effect repairs for a period of not less than one (1) year from date of acceptance by the Customer. The Customer shall deem acceptance as beneficial use. **B.** Transfer manufacturer's warranties to the customer in addition to the General System Guarantee. Detail specific parts within equipment that are subject to separate conditional warranty. Warranty proprietary equipment and systems involved in this contract during the guarantee period. Final payment shall not relieve the vendor of these obligations. **C.** Effect replacement or substitutions of equipment within 24 hours of first notification with components equal to or better than the original. Complete repairs to equipment within 72 hours. If repairs cannot be completed during this time period, or if ordering of parts is required, Supplier shall forward to the customer documentation of progress of repairs every 72 hours. This repair capability is mandatory. **D.** All systems and components shall be provided with the availability of a toll free 24-hour technical assistance program from the manufacturer. Technical assistance shall be available for the dealer/installer or owner at no charge.

QUALITY ACCEPTANCE INSPECTION: Upon completion of the project, as call for herein, the contractor must request a Quality Acceptance Inspection. Such requests must be forwarded (in writing) to Union County Public Schools, Attn: Penny Helms, 201 Venus Street, Monroe NC 28112. Fax 704-283-2371.

INVOICES WILL NOT BE PAID BY UNION COUNTY PUBLIC SCHOOLS UNTIL QUALITY ACCEPTANCE HAS BEEN ACCOMPLISHED.

CLEAN-UP: Contractor shall remove and properly dispose of all waste and debris from the installation site on a daily basis leaving the installation area clean and ready for use.

AWARD CRITERIA: The right is reserved to award this contract to a single overall bidder on all items, or to make awards on the basis of individual items or groups of items, whichever shall be considered by Union County Public Schools to be most advantageous or to constitute its best interest. Bidders should show unit prices, but are requested also to offer a lump sum price. In determining which bid is the lowest responsible bid, the Owner may take into consideration not only the amount of the bid such of the following criteria as it , in its discretion, deems appropriate and may give such weight thereto as it deems appropriate:

a. The bidder's prior experience with similar work on comparable or more complex projects.
b. The bidder's prior history for the successful and timely completion of projects.
c. The bidder's equipment and facilities.
d. The adequacy, in numbers and experience, of the bidder's work force to complete the Contract successfully and on time.
e. The bidder's prior experience on other projects of the Owner, including the bidder's demonstrated ability to complete its work on these projects in accordance with the Contract Documents and on time.
f. The bidder's compliance with federal, state, and local laws, rules, and regulations.
g. Depending upon the type of work, other essential factors, such as warranty guarantees and contractor qualifications.

PRIME VENDOR CONCEPT: Union County Public Schools will award any contract that may be issued as a result of this IFB to a single prime vendor. The prime vendor must assume responsibility for hardware, software, documentation and all other products and services in support of the requirements. Vendors who submit proposals as prime contractors may wish to prive all of the proposed products and services directly, or provide certain elements directly and the remainder through subcontractors. Under the prime contractor agreement, subcontractors are allowed and encouraged. However, the prime contractor must provide positive evidence that it will be responsible for all products and services provided to satisfy the requirements and specifications of this IFB.

SUITABILITY FOR INTENDED USE: Bidders are requested to offer only comparable equipment which will provide the equivalent capabilities, features, and diversity called for herein. Union County Public Schools reserves the right to evaluate all proposals for suitability for the required use and to award the one best meeting requirements and thought to be in Union County Public Schools best interest. All bidders must receive prior approval for all substitutions before bid submittal. Request to accept substitutions must be sent to Penny Helms, UCPS Purchasing and Contract at penny.helms@ucps.k12.nc.us or 704-296-3160 ext 893.

DESCRIPTIVE LITERATURE: All bids must be accompanied descriptive literature, specifications, and other pertinent data necessary for their evaluation as required by the attached General Contract Terms & Conditions, otherwise, they will be subject to rejection.

LIABILITY:

A. VENDOR'S liability to UNION COUNTY PUBLIC SCHOOLS or for claims by UNION COUNTY PUBLIC SCHOOLS based on injury to any third party for personal injury or damage to real property or tangible personal property or real property or tangible personal property shall include but not be limited to any claim, etc. This shall include any claim for which VENDOR is found to be legally liable arising form the failure of any VENDOR supplied product, replacement parts furnished by VENDOR, or of and VENDOR licensed program to operate in any material respect in accordance with any representation by VENDOR, whether in VENDOR'S, response to any Invitation of Bid or Proposal by UNION COUNTY PUBLIC SCHOOLS, or in any published specifications or literature, or failure arising from services rendered by VENDOR'S employees. Claims shall not be limited by any clause whether found in any agreement between VENDOR and UNION COUNTY PUBLIC SCHOOLS or in any VENDOR invoice or any other paper writing that purports to limit the remedies to UNION COUNTY PUBLIC SCHOOLS arising out of such failure.

B. VENDOR'S liability as described in paragraph A shall include the repair, restoration or replacement, within a reasonable time of all damaged or destroyed, real or tangible personal property including buildings, furniture fixtures, supplies, computer hardware, software and associated equipment (VENDOR AND NON-VENDOR supplied), and information storage media of whatever description together with duplication of data files from existing UNION COUNTY PUBLIC SCHOOLS backup media. In addition, VENDOR'S liability for damages described in paragraph A shall include all damages suffered by UNION COUNTY PUBLIC SCHOOLS, whether such damages are or might be classified as direct or consequential, which require the expenditure of public moneys (1) reasonably required to restore the Product (s) involved to its full original operational capability, (2) for temporary remedial measures reasonably required to perform any of the functions of the involved Product(s) during the restoration period, and (3) to pay any penalties imposed on UNION COUNTY PUBLIC SCHOOLS by and Federal entity which penalties are the result of interruptions caused by the failure of any VENDOR product (s) during the restoration period, and (3) to pay any penalties imposed on UNION COUNTY PUBLIC SCHOOLS by and Federal entity which penalties are the result of interruptions caused by the failure of any VENDOR product(s) or arising from services rendered by VENDOR'S employees for which VENDOR is found to be legally liable.

C. Except as specifically provided above, in no event will VENDOR be liable for any damages caused by UNION COUNTY PUBLIC SCHOOLS failure to perform UNION COUNTY PUBLIC SCHOOLS responsibilities, or for any lost profits, lost savings, or other economic consequential damages even if VENDOR has been advised of the possibility of such damages, or for any claim by UNION COUNTY PUBLIC SCHOOLS based on any third party claim except as provided in paragraphs A and B above.

D. Except as provided above, any clauses in any agreements between the VENDOR and UNION COUNTY PUBLIC SCHOOLS that purport to limit remedies available to UNION COUNTY PUBLIC SCHOOLS remain in force, however VENDOR covenants that in any dispute with UNION COUNTY PUBLIC SCHOOLS regarding damages covered by the preceding paragraphs A through C, such clauses do not, nor will they be pleaded to, bar such damages.

E. User Installed Software Only: Notwithstanding any other provisions contained herein, for user installed software, the liability of the vendor shall be limited to the replacement of the defective software or the full refund of the price paid, at the option of UNION COUNTY PUBLIC SCHOOLS.

F. Except as provided above, nothing contained herein shall be construed to limit any remedy, at law or in equity, available to either party.

LIQUIDATED DAMAGES

The Owner and Vendor recognize that time is of the essence to this Agreement and that the Owner will suffer financial loss if the work is not completed within the times specified in this IFB. Both parties also recognize the delays, difficulties and expense involved in proving, in a legal or arbitration proceeding, the actual loss suffered by the Owner if the Work is not completed on time. Accordingly, in lieu of requiring such proof, the Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) the Contractor shall pay to the Owner for each consecutive calendar day in excess of the term allowed for completion of the Work, the Contractor shall pay to the Owner the sum of **$500.00** as liquidated damages.

 BIDDER: _____

ATTACHMENT A

RESPONSE CHECKLIST

This document shall be page 1 of proposal response. All elements of said response shall appear in the order listed below.

☐ FULL IFB DOCUMENT 1-9738422A
- ➢ Completed Page 1
- ➢ Completed Page 3
- ➢ Completed Page 7

☐ GOOD FAITH EFFORTS (see Part 3,K Page 9 & "Good Faith Efforts" packet)

☐ CONTRACTOR & SUBCONTRACTOR FORMS (see Part 4,A Page 10)

☐ BID BOND IN THE AMOUNT OF 5% OF TOTAL BID

☐ UPON AWARD-PERFORMANCE BOND OF 100% OF BID AMOUNT.

☐ CERTIFICATE OF INSURANCE
- ➢ "UNION COUNTY" and "UNION COUNTY BOARD OF EDUCATION" LISTED AS ADDITIONAL INSURED AND AS CERTIFICATE HOLDER (this is recommended to be included in bid submittal required within 48 hours of request)

 BIDDER: _____

ITEM	QTY	UOM	DESCRIPTION	UNIT COST	TOTAL EXTENDED COST
1.	1	SYSTEM	WESTERN UNION ELEMENTARY SCHOOL FURNISH AND INSTALL DDC CONTROLS PER SPECIFICATIONS TO INCLUDE TRAINING	$ 53,500	$ 129,900 LU

Definitions:

Unit Cost:	Cost of materials
Total Extended Cost:	All inclusive cost (material, labor, shipping and handling, tax, etc.)
Complete:	Contractor has performed to the extent of the specifications and received final approval by the Project Coordinator of Union County Public Schools.

NOTE: Schneider Electric will Give a 2% discount IF We are allowed to do Monthly progress Billing and paid By UCPS each Month as progressed billed.

PART 1 – GENERAL SYSTEM REQUIREMENTS

A. The Direct Digital Controls (DDC) is intended to be upgraded to achieve a more effective control over the HVAC system in the entire campus of Western Union Elementary School and effectively promote energy conservation.
B. Contractor shall upgrade the remaining pneumatic/electric control system to a full web based DDC control system with web based graphical user interface in accordance to the specifications and sequence contained in this document. This shall be an extension to the existing TAC web based system currently installed. The Contractor shall add the graphics web pages to UCPS existing to the existing R2. A new Tridium Jace is required for the site. Integration to any existing mechanical units is not acceptable. All controls contractors shall tie to their existing control systems if applicable.

PART 2 – GENERAL LABOR REQUIREMENTS

A. Remove and replace all existing pneumatic valve bodies and actuators with new valve bodies and electronic actuators. All existing pneumatic damper actuators shall be replaced by new electronic actuators. Valve retro-fit kits are not acceptable.
B. Remove and replace all existing pneumatic/electric control devices on all FCU's, UV's, AHS's, RTU's, Boiler and Chillers and other associated mechanical equipment. Central Plant mechanical equipment and other specific mechanical equipment associated with the control system including exhaust fans, with an Application Specific DDC Control Device for each mechanical equipment. The air compressor shall be abandoned in place.
C. Provide complete DDC System for the entire campus which includes, Unit Ventilators, Chiller, Boiler Rooftop Air Handler, and various DX units with web based graphical design.
D. The new DDC system shall have all of the points available and components as listed in the specifications and on the points diagrams.
E. The Web Graphic Design shall have full global override control points on each graphic screen and global "Occupied" and "Unoccupied" on the main screen accessible by UCPS end users that have override access levels.
F. Cooler, freezer, and outside air temperature and humidity sensors shall be provided in addition to all other control points contained in this document.
G. Control and interlock wiring in conduit for exposed areas and plenum cable allowed in concealed plenum rated areas.
H. The system shall have remote access capabilities via a web based browser so all points can be viewed remotely and those select on the points diagram can be changed remotely.
I. The contractor shall provide a PC and monitor at the site in the mechanical room and shall have all of the hardware and software as listed in the specifications. (see part 8,F)
J. It is entirely the responsibility of the controls contractor to verify all types and quantities of mechanical equipment to be controlled for each location. The successful contractor shall also be responsible to generate a list of defective mechanical equipment identified during the controls upgrade and turn over to the project coordinator.
K. Contractor may work on business days during the hours of 8:00 am through 8:00 pm providing no disruption to school's activities. All work shall be coordinated with the assigned Project Coordinator for UCPS.

PART 3 – ADDITIONAL REQUIREMENTS

A. Contractor shall be responsible for all measurements
B. Contractor shall be responsible for all programming, training, and wiring
C. Contractor shall consider this a turn-key project
D. A final inspection shall be performed by Union County Public Schools staff prior to the contractor leaving the job site.
E. The North Carolina Sales and Use Tax Certification Form shall be submitted with Invoice to receive payment.
F. Union County Public Schools is a tobacco-free facility.
G. All representatives of Contractor shall comply with the Jessica Lunsford Act.
H. Contractor is responsible for all damages to Union County Public Schools Property and shall report such damage immediately to the UCPS Project Coordinator and the UCPS Purchasing and Contract Coordinator.
I. Contractor shall be responsible for the removal of all debris resulting from project and properly dispose it off Union County Public Schools property.
J. Bidder shall provide the Good Faith Efforts in reaching the Historically Underutilized Business as required in the attached packet entitled "Good Faith Efforts".

PART 4 – QUALITY ASSURANCE

A. The Contractor shall complete and submit the Contractor and Subcontractor Information Sheets with bid documentation. All subcontractors must receive prior approval by Union County Public Schools.
B. Bidder must complete and submit Affidavit A (reaching a minimum of 50 points) or Affidavit B with the bid documents. Failure to do so will result a non-responsive bid. The remaining documents in the Good Faith Efforts shall be submitted to the UCPS Purchasing and Contract Coordinator prior to award.
C. Contractor shall meet the following criteria:
    1. Be a factory branch or authorized representative of a national firm having a minimum of five years experience in the design and installation of computerized building systems similar in performance to that specified. Provide evidence of experience by submitting resumes of the project manager, the local manager, project engineer, the application engineering staff, and the electronic technicians to be involved with the supervision, the engineering, and the installation of the system. Information concerning the amount of training and experience shall be included in each resume. The resumes must be submitted within 24 hours of request.
    2. Be in compliance with ISO-9001 (Model for Quality Assurance in Design/Development, Production, Installation, and Servicing) as issued by the International Organization for Standardization.
    3. Use only factory trained and certified personnel to perform programming, final DDC connections, system start-up, diagnostics and warranty service.

PART 5 – TRAINING AND DEMONSTRATION

A. The Controls Subcontractor shall provide the Owner's system operators complete instructions for proper control of the system under all modes of operation. These modes shall include, but not be limited to, summer/winter, occupied/unoccupied, energy management, alarm event sequences, etc. Provide on the job training during start-up, checkout and performance test period. On the job training shall consist of facilities personnel working with the Control System Suppliers installation and test personnel on a daily basis. During the performance test period, provide two (2) 8-hour periods or four (4) 4- hour periods of instruction for each location. The instructions shall be conducted during normal working hours, Monday through Friday at the job site and at the Energy Management Office, as direct by Owner. Additional energy management training shall be provided to Operations Personnel.
B. The O/M Manuals shall contain approved submittals as outlined above. In addition, provide diagrammatic layouts of the DDC systems specified. The layouts shall show all DDC cabinets, all connected mechanical systems; location and function of each sensor, actuator, and equipment cut sheets of the entire system. O/M Manual shall contain a detailed description of the systems and a complete listing of all software programs required to perform the sequence of operation. O/M Manual shall describe all commands, operating, and troubleshooting instructions, and routine maintenance procedures to be used with the systems. Three (3) copies shall be supplied and utilized in operator's training curriculum. Each hard copy shall be accompanied by an electronic version of the complete MEP prints on CD.

PART 6 – WARRANTY AND SERVICE

A. Provide all labor, material and equipment necessary to maintain beneficial performance of the entire control system for a period of one (1) year after acceptance of the system and parts thereof, by an authorized representative of the owner. The contractor at no charge to the owner shall promptly correct any defects in workmanship and material during the warranty period. All work shall be accomplished during normal working hours, Monday through Friday if possible. Critical component failures shall be repaired immediately whether labor involves overtime on weekends or holidays. Precautions shall be taken to minimize disruption of facility operations.
B. A contact list with the appropriate people shall be provided for the warranty period. It shall include the name, office number, cell phone number, and pager number if applicable.
C. Owner's involvement in modifications to hardware and/or software or the addition of panels and points shall not void warranty.
D. The controls contractor is obligated to meet as much of the sequences (listed herein) that are applicable for the mechanical equipment components that currently exist and that are not being replaced. No new mechanical equipment shall be provided by the Controls Contractor in order to satisfy the control sequences, unless specified by the owner or design engineer or if new mechanical equipment is being provided that apply to the sequences listed herein.

PART 7 – GENERAL DESIGN CRITERIA

A. Common industry protocols shall be native Bacnet over Ethernet or LonTalk for all systems including primary and secondary networks. Gateways are not acceptable. Prospective bidders must submit supporting documentation disclosing the protocols used for their system in an architecture pictorial. Owner shall have sole discretion to approve or disapprove the control system vendors. Approved manufacturers are Schneider Electric/TAC-I/A Series, Hoffman & Hoffman/Alerton, ALC.
B. Preferred Alternate for controls is Schneider Electric/TAC.
C. Approved manufacturers shall have, at minimum, three-fulltime factory trained servicemen located within fifty miles of UCPS Building Services, and with a minimum of five years experience.
D. HVAC control systems shall be full DDC. All control wiring in the cable tray shall use blue and yellow colored plenum rated cable. Each color shall be consistent for the entire project and noted on the plans. Blue should be used for the primary network cable and yellow for secondary network connections.
E. HVAC systems major renovations shall include complete DDC controls as part of the system changes. Phased projects shall provide a single system interface (pneumatic/DDC) during the construction phase until complete DDC controls have been installed at the completion of the project.
F. All Building Automation Systems shall have Ethernet connections to interface with the LAN or WAN.
G. (1) One new Desktop computer shall be provided for each site. See specifications (Part 8-E)

PART 8 – SUBMITTALS GENERAL

A. Contractor shall provide UCPS Project Coordinator with the following information in binder and CD form:
   1. Control Submittals and wiring diagrams
   2. Product Data Sheets
   3. Global DDC Controllers
   4. Controller Software specifications
B. Submittals shall demonstrate compliance with technical requirements by reference to each subsection of this specification. Where a specific item does not comply with specification requirements, the deviation shall be presented to UCPS Purchasing and Contract Coordinator a minimum of 5 days prior to bid, along with information as to how the intent of the specification requirement is to be satisfied, for approval. It is the Contractor's responsibility to demonstrate compliance. Union County Public Schools (UCPS) have the right to reject any substitutions that deviate from this specification.
C. Contractor shall schedule a minimum of two meetings with Owner's Energy Manager to review control drawings, software, sequence of operation, and installation strategies before proceeding with the installation.
D. Manufacturer's literature and data for all components, including the following shall be submitted:
   1. One-line schematics of control piping and wiring of sensors and actuators to Digital Control Panel (DCP) cabinets.
   2. Schematic of all termination points within each cabinet.
   3. Catalog cut sheets of all equipment used. This includes, but is not limited to DCP's, peripherals, sensors, actuators, etc.
   4. Detailed descriptions of specified DDC algorithms.
   5. Flow charts for each sequence of operation or control strategy.
   6. Define a preliminary scope and sequence of field tests that will be executed to demonstrate that the system performs all specified functions. Include in the scope the method by which accuracy will be demonstrated.
   7. FCC Part 15 listing certificates for all equipment.
   8. UL 864 and UL 873 and/or UL 916 listing certificates for all equipment.
   9. Details of communications wiring, electrical isolation, surge and lightning protection, etc.
E. Control Drawings: Integrate with HVAC drawings on one-line control diagrams. Show and identify all HVAC equipment and control devices for all air, water, and steam system. Equipment and control labels shall correspond to those shown on drawings.
   As-Built Control Drawings: Provide at approximately 80% of construction completion.
   1. One complete set of prints (Control Drawings) shall be available for viewing from the server.
   2. One set of drawings to Energy Manager of UCPS in electronic media storage, AutoCAD V13.DWG format, Visio, or fully compatible .DXF format.

F. EMS Desktop Computer Specifications:
   1. Hardware:
      a. Energy Star Compliant (Monitor and Computer)
      b. 19" Desktop Monitor
      c. Pentium or AMD Dual Core Processor (2.0 GHZ or higher)
      d. Hard Drive 120 Gigabytes
      e. 4 Megabyte Ram
      f. CD-RW Drive
      g. Integrated 56 K V.90 Modem with Ethernet Capability
      h. Min. 128 MB Video Ram with 128-bit Accelerator
   2. Software:
      a. Windows XP Professional Service Pack 2
      b. Microsoft Explorer
      c. Netscape Navigator
      d. EMS System Software or software from server
   3. Operation and Maintenance (O/M) Manuals: Provide detailed product information on all control hardware, including but not limited to relays, sensors, transducers, actuators, etc.
      a. Any custom control programs shall be documented and explained in the English language and step-by-step instructions on how to change parameters and create additional custom control programs provided. Coordinate documentation format(s) with UCPS prior to creating O/M Manuals.
      b. Final Control Algorithms Documentation: Provide final version of all control software at completion of construction. Provide, for each control algorithm, a flowchart with English language descriptions of all variables, functions, decisions, etc.

PART 9 – CODES AND STANDARDS

A. The components of the DDC system shall comply with the latest editions of the following codes and standards, as applicable:
   1. Instrument Society of America (ISA):
      57.3 Quality Standard for Instrument Air (R1981)
   2. National Fire Protection Association (NEPA):
      70 National Electrical Code
   3. Federal Communications Commission (FCC):
      Rules and Regulations Volume II (July 1986) Part 15, Subpart J, Class A,
      Radio Frequency Devices
   4. Underwriters Laboratories (UL):
      UL 864 Sub-categories; Fire Signaling and Smoke Control Systems
      UL 873 Temperature Indications and Regulating Equipment
      UL 916 Energy Management Systems
   5. For electrical equipment and products, comply with applicable NEMA standards, and refer to NEMA standards for definitions of terminology herein. Comply with National Electrical Code (NFPA 70) for workmanship and installation requirements.
   6. Labeling: All products shall be labeled with the appropriate approval markings.

PART 10 – PERFORMANCE TESTS

A. Demonstrate that all controls are installed, adjusted, and can perform all functions required by the drawings and specifications. When coordinated with the Energy Manager with an advance two week notice, this demonstration may be performed in conjunction with instructions to the Owner's operations personnel.
B. Individual Building Final Operational Tests:
   1. Performance Test Period: Not less than 720 consecutive hours (30 days) to demonstrate proper functioning of the complete system. Continue test on a day-to-day basis until the performance standard is met.
   2. Acceptance Performance Standard: Operation at a reliability level (ARL) of at least 95 percent for the performance test period. Whenever downtime occurs, correct defects before resuming test. Failure, due to an individual sensor or controller, shall not count as system downtime provided that:
      a. The system records the fault
      b. The ARL for all sensors and controllers together is at least 99 percent of the test period.

PART 11 -- HARDWARE

A. I/O MODULES
   1. All board shall have relays for outputs (No Triacs).
   2. All modules shall have a minimum of two megabytes of memory for trending and shall not dump programs when the memory is full.
   3. All modules shall have flash memory and a 32 bid processor
   4. All modules shall be capable of Arc net over Ethernet or Lon Talk at a minimum speed of 78K baud rate.
   5. Each module shall have LED indicators for relay status, communication-transmit/receive, and error indications. Relays shall have status LED's.

B. ACTUATORS
   1. All actuators shall be Belimo or equal (All equals must be reviewed and approved by UCPS Project Coordinator.

C. TEMPERATURE SENSORS:
   1. Room thermostats are to be provided for control of exhaust fans where indicated. They shall provide a scale range of approximately 55 degrees to 95 degrees F with adjustable dead band. Room thermostats, except as otherwise noted, shall have concealed adjustment and shall not have a thermometer.

D. ROOM TEMPERATURE SENSORS:
   1. Room sensors are to be provided for control of air handlers, heat pumps and unit ventilators where indicated. The sensor shall consist of a thermistor with a nominal resistance of 10000 ohms at 77 Degrees Fahrenheit (RDD's shall also be acceptable), termination block with screw terminals mounted on a printed circuit board and a remote communication port (RJ11), if required.

PART 12 – SOFTWARE

A. WEB INTERFACE
   1. A full graphical user interface shall be provided that allows the owner to access EMS data remotely via the internet or intranet. This interface shall use HTML based pages to send or receive data from an EMS system to a web browser.
   2. The software shall run on the Microsoft Internet Explorer (6.0 or higher) and the Netscape (6.0 or higher) browser.
   3. The interface shall provide a minimum of ten levels of user access. Users will range from read-only access to EMS data (Level 1) to having complete access to view and modify EMS data and user account (Level 10). Functional password protection shall also be provided for use at owner's discretion.
   4. The interface shall provide a user account utility; complete with a user profile database that includes user ID, encrypted password, access level, and language preference. Operators with the appropriate access level shall be able to modify, and delete users within the user profile database, as well as change users' access levels.
   5. The interface shall provide a means by which the user can collect (EMS data points) into "summary" groups. This functionality shall allow authorized users to perform actions ranging from viewing summary groups, to adding items to or deleting items from groups, to creating new summary groups.
   6. The web-based interface shall provide the following four screens (or views) and the indicated functionality for each:
      a. Logon screen-allows the user to enter his or her user name and password for logging into the system.
      b. System view-provides the following three panels:
         1) Browser-the user can browse the available server(s) and view the ranges of information (EMS data points) associated within each.
         2) Items-the panel displays the items (EMS data points) associated with the server selected in the browser panel
         3) Operation-displays the operation and its value associated with the item selected in the items panel, and allow authorized users to modify the item or to add the item to a summary.
      c. Summary view-allows the user to view items that have been grouped together into summaries, and allows authorized users to modify or delete groups or items within a group.

B. BAS FRONT-END SOFTWARE

1. End user front-end software shall have the capability to provide an interface for full graphical programming using graphics blocks.
2. Tridium R2 Jaces or AX Jaces shall be provided by the Controls Contractor and all licenses and software property of UCPS. A new AX server shall be required if an AX Jace is provided by the Controls Contractor. Existing RS servers are to be utilized by the Controls Contractors.
3. The software shall have off-line/on-line simulation capabilities.
4. Group scheduling, individual scheduling, with the ability to group individual areas.
5. Access to sequence of operation shall be included in the software with access through a radio button or menu command. The sequence of operation shall include text descriptions of actual sequence of operation with dynamic data set-points embedded in the test that can be changed in the screen and updated real-time.
6. All graphic representations of equipment must include actual test & balance settings according to final Test and Balance report. Controls vendor(s) are required to reprogram front-end software to reflect actual T & B settings after completion at no additional cost.
7. The owner shall have access to lead/lag operation set points and have the option to use either run-time based algorithms or calendar year selection of lead pumps, chillers, and boilers.
8. All dual temperature systems must have auto changeover included in the hardware and software installation of the BAS system.

Sequence of Operation

VAV Air Handling Unit Control VFD Supply fan + Economizer + CHW Control + HW Control

Run Conditions

1. The AHU will run to provide minimum ventilation when any zone becomes occupied. Outside damper shall be regulated by a Thermal dispersion or Vortex-shedding flow meter, or mounted in the outside air intake duct, to maintain constant minimum outside air volume, regardless of air volume reduction.
    a. The AHU will continue to run for 1 minute after the last zone it serves transitions from occupied to unoccupied.
2. The AHU will run to provide 100% of the zone heating or cooling when the system is unoccupied and the AHU receives a run request and at least 12 heating request(s) or 12 cooling request(s) from a zone.
3. When the AHU received a run request from the boiler, the AHU will run.
4. The user will be able to lock the signal to the AHU.
5. If the smoke detector trips the AHU controller will generate an alarm and shut down the system.
6. If the freezer stat trips the AHU controller will generate an alarm and shut down the fan.
7. If the high static pressure switch trips the AHU controller will generate an alarm and shut down the fan.
8. If an emergency shutdown signal is sent over the network the AHU controller will generate an alarm and shut down the fan through the Auto Control.

Fan Control

1. The AHU controller will send a run signal to the fan if the AHU is called to run. The AHU start signal will be disabled by any of the following shutdown conditions: smoke, freeze stat, high static pressure, or an emergency shutdown signal from the network. This logic does not replace the hardwire unit shutdown requirements of many local codes.
    a. When called to run, the fan will run for a minimum of 5 minutes.
    b. When the fan cycles off, it will remain off for a minimum of 5 minutes.
2. The AHU controller will track the supply fan's accumulated runtime.
    a. When runtime exceeds 10,000 hours, the controller will generate a runtime expiration message.
3. If the supply fan proof indicates that the signal to the fan and the feedback from the fan have not matched for at least 30 seconds (feedback delay), the AHU controller will generate an alarm.
    a. When the run signal is on and the status signal has indicated that the fan is running for 5 seconds, the controller will indicate that the fan has flow.
    b. If the run signal commands the fan on and the status indicates that it is off, the controller will generate a supply fan fail alarm.
    c. The AHU controller will generate a hand operation alarm if the run signal commands the fan off and the fan feedback continues to indicate that the fan is running after the feedback delay.
    d. The controller will require that both the signal and feedback indicate that the supply fan is operating normally for 10 seconds (debounce time) before clearing an alarm.
4. If the VFD generates a fault and remains in a fault condition after 5 seconds, the AHU controller will generate an alarm.
5. If the filter status trips and remains tripped after 10 minutes, the AHU controller will generate an alarm.

Supply Air Static Pressure Control

1. When the supply fan has flow, the AHU controller will modulate the VFD with a reverse-acting static pressure PID to maintain the duct static pressure at the static pressure adjustable setpoint (1.5" H2O).
    a. If the supply fan is running, the PID will send a minimum signal of 20% to the supply fan VFD.
    b. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
2. The user will be able to lock the output signal to the VFD.
3. If the supply fan loses flow, the AHU controller will disable the output from the static pressure PID. If the supply fan loses its run signal, the controller will set the VFD output to zero.
4. If the supply static pressure remains 25% higher than setpoint for 1 minute with a 0.10" H20 hysteresis, the AHU controller will generate an alarm.
5. The AHU controller will generate an alarm if the supply static pressure remains 25% lower than setpoint for 5 minutes with a 0.10" H20 hysteresis. This alarm will not be enabled until the supply fan has been running for 2 minutes.

Supply Air Temperature Setpoint Control

1. The AHU controller will run a cooling setpoint optimization algorithm.
    a. The initial cooling adjustable setpoint will be 55° F, with a minimum of 53°F, and a maximum of 65°F.
    b. If any zones are calling for cooling at the end of a 5 minute period, the setpoint algorithm will respond by lowering the setpoint by 1°F for every zone requesting cooling.
    c. If no zones are still calling for cooling at the end of a period, the setpoint algorithm will respond by raising the setpoint by 1°F.
    d. The cooling setpoint algorithm will not adjust the cooling setpoint by more than 2°F in any period.
    e. The initial heating adjustable setpoint will be 82°F, with a minimum of 72°F and a maximum of 85°F.
2. The AHU controller will determine the AHU supply air temperature setpoint based on the number of heating requests and cooling request the AHU is receiving.
    a. If there are more cooling requests than heating requests coming into the AHU, or if there are the same number of heating request as cooling requests, the AHU controller will use the cooling setpoint.
    b. If there are more heating requests than cooling requests coming into the AHU, the AHU controller will use the heating setpoint.
    c. When the AHU controller switches from the heating setpoint to the cooling setpoint, the setpoint control algorithm will ramp from the heating setpoint to the cooling setpoint at a rate of 1°F/minute.
    d. When the AHU controller switches from the cooling setpoint to the heating setpoint, the setpoint control algorithm will ramp from the cooling setpoint to the heating setpoint at a rate of 1°F/1.5 minute.
3. The user will be able to override the supply air temperature setpoint.
4. The AHU controller will generate an alarm if the supply air temperature remains 5°F lower than the supply air temperature setpoint for 5 minutes with a 1°F hysteresis. The alarm will not be enabled until the supply fan has been running for 30 minutes.
5. The AHU controller will generate an alarm if the supply air temperature remains 5°F higher than the supply air temperature setpoint for 5 minutes with a 1°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.

Heating Control

1. If the outside air temperature is less than 55°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will enable heating.
2. If the outside air temperature reading is not valid, the AHU controller will still enable heating.
    a. The user will be able to disable heating if the outside air temperature reading is not valid.
3. A heating PID will modulate the hot water valve to maintain the supply air temperature at the supply air temperature setpoint if heating is enabled, the AHU has flow, heat is needed (more heating requests than cooling requests), and chilled water cooling has been disabled for at least 5 minutes.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
    b. The user will be able to lock the signal to the hot water valve.
4. If the AHU loses flow, the AHU controller will open the hot water valve.
5. If the supply air temperature drops below 40°F, the AHU controller will begin to open the hot water valve to protect the coil. The controller will continue to open the valve linearly until the temperature drops to 35°F, when the hot water valve will be 100% open.
6. If the freeze stat trips, the AHU controller will open the hot water valve.
7. If the heating PID is calling for more than 90% with a 40% hysteresis, the AHU controller will send 1 request(s) to the heat source (typically a boiler) to raise the hot water temperature.
    a. The user will be able to send a request to the heat source to run whenever the AHU is running, regardless of the heating PID output.
    b. When the AHU controller sends a run request to the heat source, it will also indicate to the heat source how long the AHU anticipates it will be running.
    c. When the AHU is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early heat source shutdown on transition from unoccupied to occupied.

Cooling Control

1. If the outside air temperature is greater than 60°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will enable cooling.
2. If the outside air temperature reading is not valid, the AHU controller will still enable cooling.
    a. The user will be able to disable cooling if the outside air temperature reading is not valid.
3. A cooling PID will modulate the chilled water valve to maintain the supply air temperature at the supply air temperature setpoint if cooling is enabled, the AHU has flow, the hot water valve has been closed for at least 5 minutes, and either the economizer is not enabled or the economizer PID is calling for more than 90% with a 20% hysteresis.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
4. The user will be able to lock the signal to the chilled water valve.
5. If the AHU loses flow, the AHU controller will close the chilled water valve.
6. If the freeze stat trips, the AHU controller will open the chilled water vavle 50%.
7. If the cooling PID is calling for more than 90% with a 40% hysteresis, the AHU controller will send 1 request(s) to the cooling source (typically a chiller) to lower the chilled water temperature.
    a. The user will be able to send a request to the cooling source to run whenever the AHU is running, regardless of the cooling PID output.
    b. When the AHU controller sends a run request to the cooling source, it will also indicate to the cooling source how long the AHU anticipates it will be running.
    c. When the AHU is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early cooling source shutdown on transition from unoccupied to occupied.

Economizer Operation

1. The AHU controller will enable the economizer if the return air temperature is greater than the outside air temperature with a hysteresis of 5°F, the outside air enthalpy is less than the return air enthalpy, the outside air temperature is less than 65°F with a hysteresis of 2°F, and the outside air readings are valid.
2. If the outside air readings are not valid, the AHU controller will disable the economizer.
    a. The user will be able to enable the economizer if the outside air readings are not valid.
3. The AHU controller will set the mixed air temperature setpoint 2°F lower than the supply air temperature setpoint.
    a. The user will be able to lock the mixed air temperature setpoint and enter dates and times to enable and disable this lock.
4. An economizer PID will modulate the economizer dampers between 20% and 100% to maintain the mixed air termperature setpoint if the economizer is enabled and AHU has flow.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
    b. The user will be able to lock the economizer damper position.
    c. The controller will limit the signal change sent to the economizer to 1% every 2 sec. when increasing.
5. If the mixed air temperature drops below 45°F, the AHU controller will begin to close the economizer to protect the coil. The controller will continue to close the damper linearly until the temperature drops to 40°F, when the economizer damper will be 100% closed.
6. The AHU controller will generate an alarm if the mixed air temperature remains lower than 45°F for 5 minutes with a 5°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
7. The AHU controller will generate an alarm if the mixed air temperature remains higher than 90°F for 5 minutes with a 5°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
8. If the AHU loses flow or the freeze stat trips, the AHU controller will close the economizer dampers.

Alarm Notification

1. The controller will indicate an alarm condition by showing red on the graphic display.
2. The controller will display alarms on the Event Page in WebCTRL.
    a. WebCTRL will notify the user with a printout, e-mail, sounds or other reporting actions, depending on user configuration.
    b. The controller will also indicate alarms on the appropriate properties pages and on the logic display.

Alarm ID	Alarm Type	Alarm Conditions
SHUTDOWN	Change of State	Signal sent from network
FREEZE	Change of State	Freeze stat tripped
SMOKE	Change of State	Smoke tripped
SSP_STOP	Change of State	High Static tripped
VFD_FLT	Change of State	VFD Fault tripped for 5 sec.
SF_FAIL	Change of State	Run=on, Status=off
SF_HAND	Change of State	Run=off, Status=on
SF_RNTM	Change of State	SF Runtime>10000 hrs.
MAT_HI	Off-Normal	MAT>80°F for 5 min.
MAT_LO	Off-Normal	MAT<45°F for 5 min.
SAT_HI	Off-Normal	SAT>(SAT Setpoint + 5°F) for 5 min.
SAT_LO	Off-Normal	SAT>(SAT Setpoint - 5°F) for 5 min.
SSP_HI	Off-Normal	SSP>(Static Setpoint + 25%) for 1 min
SSP_LO	Off-Normal	SSP>(Static Setpoint – 25%) for 5 min.

Trends

1. All I/O points will be linked to a BACnet Trend Object, and additional trend objects will be provided as shown in the tables below.
    a. The controller will be able to record a trend sample every 10 minutes on each of the trend objects.
    b. The controller will save the most recent 288 samples of each trended point in the control module for view or printing.
    c. The user will be able to enable or disable trending of any of the points listed. Points marked with an asterisk will automatically be trended in the default configuration.
2. The user will be able to save any or all trend point data in a trend database for up to 1 year.
    a. The user will be able to set the buffer size (the number of data samples held in the module) and the notification threshold (the number of data samples to be accumulated in the module before WebCTRL requests data from the module). The notification threshold must be less than the buffer size and greater than zero.
    b. Expired trend data will be deleted once a day at 2:30 am.

I/O Point Name	AI	AO	BI	BO	Default Trend?
Supply Static Pressure	*				*
Supply Air Temperature	*				*
Return Air Temperature	*				*
Return Air Relative Humidity	*				*
Mixed Air Temperature	*				*
Mixed Air Temperature	*				*
Supply Fan FVD Output		*			
Economizer Output		*			
Hot Water Valve Output		*			
Chilled Water Valve Output		*			
Supply Fan Status		*			*
Supply Fan VFD Fault			*		
Smoke Detector			*		
Freeze-stat			*		
Supply Fan Start/Stop				*	

Trend Object Name	AN.	Bin.	Default Trend?
Heating Requests	*		*
Cooling Requests	*		*
Supply Fan VFD %	*		*
Supply Static Pressure Setpoint	*		*
Supply Air Temperature Setpoint	*		*
Mixed Air Temperature Setpoint	*		*
Hot Water Valve %	*		*
Chilled Water Valve %	*		*
Economizer %	*		*
Run Time	*		
Run For	*		
Flow Gain Valve (for use in Test and Balance)	*		*
Occupied		*	
Run Command		*	

Constant Volume Air Handling Unit Control Supply fan + Economizer + CHW Control +HW Control

Run Conditions

1. The AHU will run to provide minimum ventilation when any zone becomes occupied.
    a. The AHU will continue to run for 1 minute after the last zone it serves transitions from occupied to unoccupied.
2. The AHU will run to provide 100% of the zone heating or cooling when the system is unoccupied and the AHU receives a run request and at least 12 heating request(s) or 12 cooling request(s) from a zone.
3. When the AHU receives a run request from the boiler, the AHU will run.
4. The user will be able to lock the signal to the AHU.
5. If the smoke detector trips the AHU controller will generate an alarm and shut down the system.
6. If the freeze stat trips the AHU controller will generate an alarm and shut down the fan.
7. If the high static pressure switch trips the AHU controller will generate an alarm and shut down the fan.
8. If an emergency shutdown signal is sent over the network the AHU controller will generate an alarm and shut down the fan.

Fan Control

1. The AHU Controller will send a run signal to the fan if the AHU is called to run. The AHU start signal will be disabled by any of the following shutdown conditions: smoke, freeze stat, high static pressure, or an emergency shutdown signal from the network. This logic does not replace the hardwire unit shutdown requirements of many local codes.
    a. When called to run, the fan will run for a minimum of 5 minutes.
    b. When the fan cycles off, it will remain off for a minimum of 5 minutes.
2. The AHU controller will track the supply fan's accumulated runtime.
    a. When runtime exceeds 10,000 hours, the controller will generate a runtime expiration message.
3. If the supply fan proof indicates that the signal to the fan and the feedback from the fan have not matched for at least 30 seconds (feedback delay), the AHU controller will generate an alarm.
    a. When the run signal is on and the status signal has indicated that the fan is running for 5 seconds, the controller will indicate that the fan has flow.
    b. If the run signal commands the fan on and the status indicates that it is off, the controller will generate a supply fan fail alarm.
    c. The AHU controller will generate a hand operation alarm if the run signal commands the fan off and the fan feedback continues to indicate that the fan is running after the feedback delay.
    d. The controller will require that both the signal and feedback indicate that the supply fan is operating normally for 10 seconds (debounce time) before clearing an alarm.
4. If the filter status trips and remains tripped after 10 minutes, the AHU controller will generate an alarm.

Supply Air Temperature Setpoint Control

1. The AHU Controller will run a cooling setpoint optimization algorithm and a heating setpoint optimization algorithm simultaneously.
    a. The initial cooling adjustable setpoint will be 55°F, with a minimum of 53°F and a maximum of 72°F.
    b. If any zones are still calling for cooling at the end of a 5 minute period, the setpoint algorithm will respond by lowering the setpoint by 1°F for every zone requesting cooling.
    c. If not zones are still calling for cooling at the end of a period, the setpoint algorithm will respond by raising the setpoint by 1°F.
    d. The cooling setpoint algorithm will not adjust the cooling setpoint by more than 2°F in any period.
    e. The initial heating adjustable setpoint will be 82°F, with a minimum of 72°F and a maximum of 85°F.
    f. If any zones are still calling for heating at the end of a 5 minute period, the setpoint algorithm will respond by raising the setpoint by 2°F for every zone requesting cooling.
    g. If no zones are still calling for heating at the end of a period, the setpoint algorithm will respond by lowering the setpoint by 1°F.
    h. The heating setpoint algorithm will not adjust the heating setpoint by more than 4°F in any period.
2. The AHU controller will determine the AHU supply air temperature setpoint based on the number of heating requests and cooling requests the AHU is receiving.
    a. If there are more cooling requests than heating requests coming into the AHU, or if there are the same numbers of heating requests as cooling requests, the AHU controller will use the cooling setpoint.
    b. If there are more heating requests than cooling requests coming into the AHU, the AHU controller will use the heating setpoint.
    c. When the AHU controller switches from the heating setpoint to the cooling setpoint, the setpoint control algorithm will ramp from the heating setpoint to the cooling setpoint at a rate of 1°F/minute.
    d. When the AHU controller switches from the cooling setpoint to the heating setpoint, the setpoint control algorithm will ramp from the cooling setpoint to the heating setpoint at a rate of 1°F/1.5 minute.
3. The user will be able to override the supply air temperature set point.
4. The AHU controller will generate an alarm if the supply air temperature remains 5°F lower than the supply air temperature setpoint for 5 minutes with a 1°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
5. The AHU controller will generate an alarm if the supply air temperature remains 5°F higher than the supply air temperature setpoint for 5 minutes with a 1°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.

Heating Control

1. If the outside air temperature is less than 55°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will enable heating.
2. If the outside air temperature reading is not valid, the AHU controller will still enable heating.
    a. The user will be able to disable heating if the outside air temperature reading is not valid.
3. A heating PID will modulate the hot water valve to maintain the space air temperature at the space air temperature setpoint if heating is enabled, the AHU has flow, heat is needed (more heating requests than cooling requests), and DX cooling has been disabled for at least 5 minutes.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
    b. The user will be able to lock the signal to the hot water valve.
4. If the AHU loses flow, the AHU controller will open the hot water valve.
5. If the supply air temperature drops below 40°F, the AHU controller will begin to open the hot water valve to protect the coil. The controller will continue to open the valve linearly until the temperature drops to 35°F, when the hot water valve will be 100% open.
6. If the freeze stat trips, the AHU controller will open the hot water valve.
7. If the heating PID is calling for more than 90% with a 20% hysteresis, the AHU controller will send 1 request(s) to the heat source (typically a boiler) to raise the hot water temperature.
    a. The user will be able to send a request to the heat source to run whenever the AHU is running, regardless of the heating PID output.

b. When the AHU controller sends a run request to the heat source, it will also indicate to the heat source how long the AHU anticipates it will be running.
c. When the AHU is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during the night setback and to prevent early heat source shutdown on transition from unoccupied to occupied.

Cooling Control

1. If the outside air temperature is greater than 60°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will enable cooling.
2. If the outside air temperature reading is not valid, the AHU controller will still enable cooling.
    a. The user will be able to disable cooling if the outside air temperature reading is not valid.
3. A cooling PID will modulate the chilled water valve to maintain the space air temperature at the space air temperatures setpoint if cooling is enabled, the AHU has flow, the hot water valve has been closed for at least 5 minutes, and either the economizer is not enabled or the economizer PID is calling for more than 90% with a 20% hysteresis.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
4. The user will be able to lock the signal to the chilled water valve.
5. If the AHU loses flow, the AHU controller ill close the chilled water valve.
6. If the freeze stat trips, the AHU controller will open the chilled water valve 50%.
7. If the cooling PID is calling for more than 90% with a 40% hysteresis, the AHU controller will send 1 request(s) to the cooling source (typically a chiller) to lower the chilled water temperature.
    a. The user will be able to send a request to the cooling source to run whenever the AHU is running, regardless of the cooling PID output.
    b. When the AHU controller sends a run request to the cooling source, it will also indicate to t he cooling source how long the AHU anticipates it will be running.
    c. When the AHU is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early cooling source shutdown on transition from unoccupied to occupied.

Economizer Operation

1. The AHU controller will enable the economizer if the return air temperature is greater than the outside air temperature with a hysteresis of 5°F, the outside air enthalpy is less than the return air enthalpy, the outside air temperature is less than 65°F with a hysteresis of 2°F, and the outside air readings are valid.
2. If the outside air readings are not valid, the AHU controller will disable the economizer.
    a. The user will be able to enable the economizer if the outside air readings are not valid.
3. The AHU controller will set the mixed air temperature setpoint 2°F lower than the supply air temperature setpoint.
4. An economizer PID will modulate the economizer dampers between 20% and 100% to maintain the mixed air temperature setpoint if the economizer is enabled, the AHU has flow, and heat is not needed (heating requests less than or equal to cooling requests).
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
    b. The user will be able to lock the economizer damper position.
    c. The controller will limit the signal change sent to the economizer to 1% every 2 sec. when increasing.
5. If the mixed air temperature drops below 45°F, the AHU controller will begin to close the economizer to protect the coil. The controller will continue to close the damper linearly until the temperature drops to 40°F, when the economizer damper will be 100% closed.
6. The AHU controller will generate an alarm if the mixed air temperature remains lower than 45°F for 5 minutes with a 5°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
7. The AHU controller will generate an alarm if the mixed air temperature remains higher than 90°F for 5 minutes with a 5°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
8. If the AHU loses flow or the freeze stat trips, the AHU controller will close the economizer dampers.

Alarm Notification

1. The controller will indicate an alarm condition by showing red on the graphic display.
2. The controller will display alarms on the Event Page in WebCTRL.
   a. WebCTRL will notify the user with a printout, e-mail, sounds, or other reporting actions, depending on user configuration.
   b. The controller will also indicate alarms on the appropriate properties pages and on the logic display.

Alarm ID	Alarm Type	Alarm Conditions
SHUTDOWN	Change of State	Signal sent from network
FREEZE	Change of State	Freeze stat tripped
SMOKE	Change of State	Smoke tripped
SF_FAIL	Change of State	Run=on, Status=off
SF_HAND	Change of State	Run=off, Status=on
SF_RNTM	Change of State	SF Runtime>10000 hrs.
MAT_HI	Off-Normal	MAT>80°F for 5 min.
MAT_LO	Off-Normal	MAT<45°F for 5 min.
SAT_HI	Off-Normal	SAT>(SAT Setpoint + 5°F) for 5 min.
SAT_LO	Off-Normal	SAT>(SAT Setpoint - 5°F) for 5 min.

Trends

1. All I/O points will be linked to a BACnet Trend Object, and additional trend objects will be provided as shown in the tables below.
   a. The controller will be able to record a trend sample every 10 minutes on each of the trend objects.
   b. The controller will save the most recent 288 samples of each trended point in the control module for viewing or printing.
   c. The user will be able to enable or disable trending of any of the points listed. Points marked with an asterisk will automatically be trended in the default configuration.
2. The user will be able to save any or all trend point data in a trend database for up to 1 year.
   a. The user will be able to set the buffer size (the number of data samples held in the module) and the notification threshold (the number of data samples to be accumulated in the module before WebCTRL requests data from the module). The notification threshold must be less than the buffer size and greater than zero.
   b. Expired trend data will be deleted once a day at 2:30 am.

I/O Point Name	AI	AO	BI	BO	Default Trend?
Supply Static Pressure	*				*
Supply Air Temperature	*				*
Return Air Temperature	*				*
Return Air Relative Humidity	*				*
Supply Fan Start/Stop				*	
Mixed Air Temperature	*				*
Supply Fan VFD Output		*			
Economizer Output		*			
Hot Water Valve Output		*			
Chilled Water Valve Output		*			
Supply Fan Status	*				*
Supply Fan VFD Fault			*		
Smoke Detector			*		
Freeze stat			*		

Makeup Air Handling Unit Control CHW Control + HW Control

Run Conditions

1. When the zone becomes occupied the AHU will run.
    a. When the zone temperature is between the occupied cooling setpoint (72°F) and the occupied heating setpoint (70°F), the AHU will provide no mechanical heating or cooling.
    b. Zone occupants will be able to set a timed local override in 60 minute increments, up to 240 minutes. While timed local override is active, the AHU will operate in the occupied mode.
2. During unoccupied mode, as long as the zone temperature remains between the unoccupied cooling and heating setpoints, the AHU will not run.
3. If the freeze stat trips the AHU controller will generate an alarm and shut down the fan.
4. If an emergency shutdown signal is sent over the network the AHU controller will generate an alarm and shut down the fan.

Zone Control

1. When the zone is unoccupied, the controller will raise the zone temperature cooling setpoint to 85°F and drop the zone temperature heating setpoint to 65°F.
    a. The occupant will be able to adjust the zone temperature heating and cooling setpoints locally by ± 2°F.
2. The controller will generate an alarm if the zone temperature remains 4°F higher than its cooling setpoint for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
3. The controller will generate an alarm if the zone temperatures remains 4°F lower than its heating setpoint for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
4. The controller will generate an alarm if the discharge air temperature remains higher than 90°F with a hysteresis of 5°F for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
5. The controller will generate an alarm if the discharge air temperature remains lower than 40°F with a hysteresis of 5°F for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.

Optimal Start Mode

1. The zone will calculate how long it will take to return from its unoccupied state to its occupied setpoint based on the heating or cooling capacity and the outside air temperature. The zone will then adjust its effective setpoint at the time necessary in order to ensure the desired zone conditions at occupancy.
2. The system will not start more than 4 hours before a scheduled occupancy.

Demand Level Setpoint Adjustment

1. When the zone controller receives demand level input from the electric meter, it will relax the zone temperature heating and cooling setpoints. The zone controller will be able to independently adjust incremental capacity adjustments and their temperature cutoffs for heating and cooling.
    a. At Demand Level 1, relax setpoint by 1°F from the occupied setpoint.
    b. At Demand Level 2, relax setpoint by 2°F from the occupied setpoint.
    c. At Demand Level 3, relax setpoint by 4°F from the occupied setpoint.

Outside Air Damper Control

1. The AHU controller will send an open signal to the outside air damper if the AHU is called to run. The damper signal will be disabled by the following shutdown conditions: freeze stat or an emergency shutdown signal from the network. This logic does not replace the hardwire unit shutdown requirements of many local codes.
    a. When called to open, the controller will send an open signal for a minimum of 2 minutes.
    b. When the damper is no longer called to open, it will remain closed for a minimum of 2 minutes.
    c. The open signal set to the outside air damper will also be sent to the supply fan and exhaust fan as a run signal.
2. If the outside air damper proof indicates that the signal to the damper and the feedback from the damper end switch have not matched for at least 2 minutes (feedback delay), the AHU controller will generate an alarm.
    a. When the damper signal calls the damper to be open and the status signal from the end switch indicates that the damper has been open for 2 minutes, the controller will indicate that the damper is open.

b. If the controller commands the damper open and the end switch status indicates that it is not, the controller will generate an outside air damper fail alarm.
c. The AHU controller will generate a hand operation alarm if the controller commands the damper closed and the end switch feedback continues to indicate that the damper is open after the feedback delay.
d. The controller will require that both the signal and feedback indicate that the outside air damper is operating normally for 10 seconds (debounce time) before clearing an alarm.

Supply Fan Control

1. The AHU controller will send a run signal to the supply fan when an open signal is sent to the outside air damper, the controller indicates that the damper is open, and the signal is not disabled by freeze stat or an emergency shutdown condition.
2. The AHU controller will track the supply fan's accumulated runtime.
    a. When runtime exceeds 10,000 hours, the controller will generate a runtime expiration message.
    b. When runtime exceeds 10,000 hours, the controller will generate a filter runtime message.
3. If the supply fan proof indicates that the signal to the fan and the feedback from the fan have not matched for at least 30 seconds (feedback delay), the AHU controller will generate an alarm.
    a. When the run signal is on and the status signal has indicated that the fan is running for 5 seconds, the controller will indicate that the supply fan has flow.
    b. If the run signal commands the fan on and the status indicates it is off, the controller will generate a supply fan fail alarm.
    c. The AHU controller will generate a hand operation alarm if the run signal commands the fan off and the fan feedback continues to indicate that t he fan is running after the feedback delay.
    d. The controller will require that both the signal and feedback indicate that the supply fan is operating normally for 10 seconds (debounce time) before clearing an alarm.
4. If the filter status trips and remains tripped after 10 minutes, the AHU controller will generate an alarm.

Exhaust Fan Control

1. The AHU controller will send a run signal to the exhaust fan when an open signal is sent to the outside air damper, the controller indicates that the damper is open; the controller indicates that the supply fan has flow, and the signal is not disabled by freeze stat or an emergency shutdown condition.
2. The exhaust fan control logic is identical to that of the supply fan, and will produce similar alarms.

Heating Control

1. If the outside air temperature is less than 55°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will allow heating based on outside air conditions.
2. If the outside air temperature reading is not valid, the AHU controller will still allow heating.
    a. The user will be able to disable heating if the outside air temperature reading is not valid.
3. When zone temperature falls below its heating setpoint and the AHU has flow a heating PID algorithm will modulate the hot water valve to maintain the zone temperature at the zone heating setpoint if outside air conditions permit heating and the chilled water valve has been closed for at least 5 minutes.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
    b. The user will be able to lock the signal to the hot water valve.
4. If the AHU loses flow, the AHU controller will close the hot water valve.
5. If the discharge air temperature drops below 40°F, the AHU controller will begin to open the hot water valve to protect the coil. The controller will continue to open the valve linearly until the temperature drops to 35°F, when the hot water valve will be 100% open.
6. If the freeze stat trips, the AHU controller will open the hot water valve.
7. If the heating PID calls for more than 90% of the maximum design heating airflow with a 40% hysteresis, the zone controller will send 1 request(s) to the heat source (typically a boiler) to raise the hot water temperature setpoint.
    a. If the zone temperature falls below the zone temperature heating setpoint by 2°F the zone controller will send 1 additional heating request(s) to the heat source.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional heating request(s) to the heat source.
    c. The user will be able to send a request to the heat source to run whenever the AHU is running, regardless of the heating PID output.

8. When the AHU controller sends a heat request to the heat source, it will also indicate to the heat source how long the AHU anticipates it will be running.
    a. When the AHU is unoccupied, the controller will send a minimum "run for" signal for 15 minutes to prevent cycling during night setback and to prevent early cooling source shutdown on transition from unoccupied to occupied.

Cooling Control

1. If the outside air temperature is greater than 70°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will allow cooling based on outside air conditions.
2. If the outside air temperature reading is not valid, the AHU controller will still allow cooling.
    a. The user will be able to disable cooling if the outside air temperature reading is not valid.
3. When zone temperature rises above its cooling setpoint a cooling PID algorithm will modulate the chilled water valve to maintain the zone temperature at the zone temperature setpoint if the AHU has flow, outside air conditions permit cooling, and heating has been off for at least 5 minutes.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
4. The user will be able to lock the cooling output signal.
5. If the AHU loses flow, the AHU controller will close the chilled water valve.
6. If the freeze stat trips, the AHU controller will open the chilled water valve 50%.
7. If the cooling PID is calling for more than 90% with a 40% hysteresis, the AHU controller will send 1 request(s) to the cooling source (typically a chiller) to lower the chilled water temperature.
    a. If the zone temperature rises above the zone temperature heating setpoint by 2°F the zone controller will send 1 additional cooling request(s) to the cooling source.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional cooling request(s) to the cooling source.
    c. The user will be able to send a request to the cooling source to run whenever the AHU is running, regardless of the cooling PID output.
8. When the AHU controller sends a cool request to the cooling source, it will also indicate to the cooling source how long the AHU anticipates it will be running.
    a. When the AHU is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early cooling source shutdown on transition from unoccupied to occupied.

Alarm Notifications

1. The controller will indicate an alarm condition by showing red on the graphic display.
2. The controller will display alarms on the Event Page in WebCTRL.
    a. WebCTRL will notify the user with a printout, e-mail, sounds, or other reporting actions, depending on user configuration.
    b. The controller will also indicate alarms on the appropriate properties pages and on the logic display.

Alarm ID	**Alarm Type**	**Alarm Conditions**
FREEZE	Change of State	Freeze stat tripped
SMOKE	Change of State	Smoke tripped
SF_FAIL	Change of State	Run=on, Status=off
SF_HAND	Change of State	Run=off, Status=on
SF_RNTM	Change of State	SF Runtime>10000 hrs.
EF_FAIL	Change of State	Run=on, Status=off
EF_HAND	Change of State	Run=off, Status=on
EF-RNTM	Change of State	SF Runtime>10000 hrs.
ZTMP_HI	Off-Normal	Zone Temp>(Zone Temp Setpoint + 8°F) for 5 minutes
ZTMP_LO	Off-Normal	Zone Temp<(Zone Temp Setpoint - 8°F) for 5 minutes
DAT_HI	Off-Normal	DAT>90°F for 5 min.
DAT_LO	Off-Normal	DAT<40°F for 5 min.

Trends

1. All I/O points will be linked to a BACnet Trend Object, and additional trend objects will be provided as shown in the tables below.
    a. The controller will be able to record a trend sample every 10 minutes on each of the trend objects.
    b. The controller will save the most recent 288 samples of each trended point in the control module for viewing or printing.
    c. The user will be able to enable or disable trending of any of the points listed. Points marked with an asterisk will automatically be trended in the default configuration.
2. The user will be able to save any or all trend point data in a trend database for up to 1 year.
    a. The user will be able to set the buffer size (the number of data samples held in the module) and the notification threshold (the number of data samples to be accumulated in the module before WebCTRL requests data from the module). The notification threshold must be less than the buffer size and greater than zero.
    b. Expired trend data will be deleted once a day at 2:30 am.

I/O Point Name	**AI**	**AO**	**BI**	**BO**	**Default Trend?**
Override	*				
Zone Temp	*				*
Setpoint Adjust	*				
Discharge Air Temperature	*				*
Hot Water Valve Output		*			
Chilled Water Valve Output		*			
Freeze stat			*		
Supply Fan Status			*		*
Exhaust Fan Status			*		*
OA Damper Output	*				
Supply Fan Start/Stop				*	
Exhaust Fan Start/Stop				*	

Trend Object Name	**An.**	**Bin.**	**Default Trend?**
Override	*		
Setpoint Adjust	*		
Heating Setpoint	*		*
Cooling Setpoint	*		*
Heating Capacity	*		
Cooling Capacity	*		

Multi-Zone Air Handling Unit Economizer, Chilled Water and Hot Water

Run Conditions

1. The AHU will run to provide minimum ventilation when any zone becomes occupied.
    a. The AHU will continue to run for 1 minute after the last zone it serves transitions from occupied to unoccupied.
2. The AHU will run to provide 100% of the zone heating or cooling when the system is unoccupied and the AHU receives a run request and at least 12 heating request(s) or 12 cooling request(s).
3. The user will be able to lock the signal to the AHU.
4. If the smoke detector trips the AHU controller will generate an alarm and shut down the system.
5. If the freeze stat trips the AHU controller will generate an alarm and shut down the fan.
6. If an emergency shutdown signal is sent over the network the AHU controller will generate an alarm and shut down the fan.

Fan Control

1. The AHU controller will send a run signal to the fan if the AHU is called to run. The AHU start signal will be disabled by any of the following shutdown conditions: smoke, freeze, stat, or an emergency shutdown signal from the network. This logic does not replace the hardwire unit shutdown requirements of many local codes.
    a. When called to run, the fan will run for a minimum of 5 minutes.
    b. When the fan cycles off, it will remain off for a minimum of 5 minutes
2. The AHU controller will track the supply fan's accumulated runtime.
    a. When the runtime exceeds 10,000 hours, the controller will generate a runtime expiration message.
3. If the supply fan proof indicates that the signal to the fan and the feedback from the fan have not matched for at least 30 seconds (feedback delay), the AHU controller will generate an alarm.
    a. When the run signal is on and the status signal has indicated that the fan is running for 5 seconds, the controller will indicate that the fan has flow.
    b. If the run signal commands the fan on and the status indicates that it is off, the controller will generate a supply fan fail alarm.
    c. The AHU controller will generate a hand operation alarm if the run signal commands the fan off and the fan feedback continues to indicate that the fan is running after the feedback delay.
    d. The controller will require that both the signal and feedback indicate that the supply fan is operating normally for 10 seconds (debounce time) before clearing an alarm.
4. If the filter status trips and remains tripped after 10 minutes, the AHU controller will generate an alarm.

Return Fan Control

1. The AHU controller will send the supply fan run signal to the return fan if the AHU is called to run.
2. The return fan control logic is identical to that of the supply fan, and will produce similar alarms.

Hot Deck Temperature Setpoint Control

1. The AHU controller will run a heating setpoint optimization algorithm.
    a. The initial heating setpoint will be 82°F, with a minimum of 72°F and a maximum of 85°F.
    b. If any zones are still calling for heating at the end of a 5 minute period, the setpoint algorithm will respond by raising the setpoint by 2°F for every zone requesting heating.
    c. If no zones are still calling for heating at the end of a period, the setpoint algorithm will respond by lowering the setpoint by 1°F.
    d. The heating setpoint algorithm will not adjust the heating setpoint by more than 4°F in any period.
2. The user will be able to override the hot deck supply air temperature setpoint.
3. The AHU controller will generate an alarm if the hot deck supply air temperature remains 5°F higher than the hot deck supply air temperature setpoint for 5 minutes with a 1°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
4. The AHU controller will generate an alarm if the hot deck supply air temperature remains 5°F lower than the hot deck supply air temperature setpoint for 5 minutes with a 1°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.

Hot Deck Heating Control

1. If the outside air temperature is less than 55°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will enable heating based on outside air conditions.
2. If the outside air temperature reading is not valid, the AHU controller will still enable heating.
    a. The user will be able to disable heating if the outside air temperature reading is not vailid.
3. A heating PID will modulate the hot water valve to maintain the hot deck supply air temperature at the hot deck supply air temperature setpoint if heating is enabled based on outside air conditions and the AHU has flow.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
    b. The user will be able to lock the signal to the hot water valve.
4. If the AHU loses flow, the AHU controller will open the hot water valve.
5. If the hot deck supply air temperature drops below 40°F, the AHU controller will begin to open the hot water valve to protect the coil. The controller will continue to open the valve linearly until the temperature drops to 35°F, when the hot water valve will be 100% open.
6. If the freeze stat trips, the AHU controller will open the hot water valve.
7. If the heating PID is calling for more than 90% with a 40% hysteresis, the AHU controller will send 1 request(s) to the heat source (typically a boiler) to raise the hot water temperature.
    a. The user will be able to send a request to the heat source to run whenever the AHU is running, regardless of the heating PID output.
8. When the AHU controller sends a run request to the heat source, it will also indicate to the heat source how long the AHU anticipates it will be running.
    a. When the AHU is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early heat source shutdown on transition from unoccupied to occupied.

Cold Deck Temperature Setpoint Control

1. The AHU controller will run a cooling setpoint optimization algorithm.
    a. The initial cooling setpoint will be 55°F, with a minimum of 53°F and a maximum of 72°F.
    b. If any zones are still calling for cooling at the end of a 5 minute period, the setpoint algorithm will respond by lowering the setpoint by 1°F for every zone requesting cooling.
    c. If no zones are still calling for cooling at the end of a period, the setpoint algorithm will respond by raising the setpoint by 1°F.
    d. The cooling setpoint algorithm will not adjust the cooling setpoint by more than 2°F in any period.
2. The user will be able to override the cold deck supply air temperature setpoint.
3. The AHU controller will generate an alarm if the cold deck supply air temperature remains 5°F higher that the cold deck supply air temperature setpoint for 5 minutes with a 1°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
4. The AHU controller will generate an alarm if the cold deck supply air temperature remains 5°F lower than the cold deck supply air temperature setpoint for 5 minutes with a 1°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.

Cold Deck Cooling Control

1. If the outside air temperature is greater than 60°F with a 2°F hysteresis and the outside air temperature is valid, the AHU controller will enable cooling based on outside air conditions.
2. If the outside air temperature reading is not valid, the AHU controller will still enable cooling.
    a. The user will be able to disable cooling if the outside air temperature reading is not valid.
3. A cooling PID will modulate the chilled water valve to maintain the cold deck supply air temperature at the cold deck supply air temperature setpoint if cooling is enabled based on outside air conditions, the AHU has flow, and either economizer is not enabled or the economizer PID is calling for more than 90% with a 20% hysteresis.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias, and loop interval).
4. The user will be able to lock the signal to the chilled water valve.
5. If the AHU loses flow, the AHU controller will close the chilled water valve.
6. If the freeze stat trips, the AHU controller will open the chilled water valve 50%.
7. If the cooling PID is calling for more than 90% with a 40% hysteresis, the AHU controller will send 1 request(s) to the cooling source (typically a chiller) to lower the chilled water temperature.
    a. The user will be able to send a request to the cooling source to run whenever the AHU is running, regardless of the cooling PID output.

8. When the AHU controller sends a run request to the cooling source, it will also indicate to the cooling source how long the AHU anticipates it will be running.
    a. When the AHU is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early cooling source shutdown on transition from unoccupied to occupied.

Economizer Control

1. The AHU controller will enable the economizer if the return air temperature is greater than the outside air temperature with a hysteresis of 5°F, the outside air enthalpy is less than the return air enthalpy, the outside air temperature is less than 65°F with a hysteresis of 2°F, and the outside air readings are valid.
2. If the outside air readings are not valid, the AHU controller will disable the economizer.
    a. The user will be able to enable the economizer if the outside air readings are not valid.
3. The AHU controller will set the mixed air temperature setpoint 2°F lower than that supply air temperature setpoint.
    a. The user will be able to lock the mixed air temperature setpoint and enter dates and times to enable and disable this lock.
4. An economizer PID will modulate the economizer dampers between 20% and 100% to maintain the mixed air temperature setpoint if the economizer is enabled based on outside air conditions and the AHU has flow.
    a. The user will be able to adjust all PID parameters (P, I, and D gains, loop bias and loop interval).
    b. The user will be able to lock the economizer damper position.
    c. The controller will limit the signal change sent to the economizer to 1% every 2 sec. when increasing.
5. If the mixed air temperature drops below 45°F, the AHU controller will begin to close the economizer damper to protect the coil. The controller will continue to close the damper linearly until the temperature drops to 40°F, whehn the economizer damper will be 100% closed.
6. If the AHU loses flow or the freeze stat trips, the AHU controller will close the economizer dampers.
7. The AHU controller will generate an alarm if the mixed air temperature remains lower than 45°F for 5 minutes with a 5°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.
8. The AHU controller will generate an alarm if the mixed air temperature remains higher than 90°F for 5 minutes with a 5°F hysteresis. This alarm will not be enabled until the supply fan has been running for 30 minutes.

Alarm Notification

1. The controller will indicate an alarm condition by showing red on the graphic display.
2. The controller will display alarms on the Event Page in WebCTRL.
    a. WebCTRL will notify the user with a printout, e-mail, sounds, or other reporting actions, depending on user configuration.
    b. The controller will also indicate alarms on the appropriate properties pages and on the logic display.

Alarm ID	**Alarm Type**	**Alarm Conditions**
SHUTDOWN	Change of State	Signal sent from network
FREEZE	Change of State	Freeze stat tripped
SMOKE	Change of State	Smoke tripped
SSP_STOP	Change of State	High Static tripped
SF_RNTM	Change of State	SF Runtime>10000 hrs.
SF_FAIL	Change of State	Run=on, Status=off
SF_HAND	Change of Sate	Run=off, Status=on
RF_RNTM	Change of State	RF Runtime>10000 hrs
RF_FAIL	Change of State	Run=on, Status=off
RF_HAND	Change of State	Run=off, Status=on
HDTMP_HI	Off-Normal	Hot Deck Tmp>(HD Tmp Setpoint + 5°F) for 5 min.
HDTMP_LO	Off-Normal	Hot Deck Tmp<(HD Tmp Setpoint - 5°F) for 5 min.
CDTMP_HI	Off-Normal	Cold Deck Tmp>(CD Tmp Setpoint + 5°F) for 5 min.
CDTMP_LO	Off-Normal	Cold Deck Tmp<(CD Tmp Setpoint - 5°F) for 5 min.
MAT_HI	Off-Normal	MAT>90°F for 5 min.
MAT_LO	Off-Normal	MAT<45°F for 5 min.

Trends

1. All I/O points will be linked to a BACnet Trend Object, and additional trend objects will be provided as shown in the tables below.
   a. The controller will be able to record a trend sample every 10 minutes on each of the trend objects.
   b. The controller will save the most recent 288 samples of each trended point in the control module for viewing or printing.
   c. The user will be able to enable or disable trending of any of the points listed. Points marked with an asterisk will automatically be trended in the default configuration.
2. The user will be able to save any or all trend point data in a trend database for up to 1 year.
   a. The user will be able to set the buffer size (the number of data samples held in the module) and the notification threshold (the number of data samples to be accumulated in the module before software requests data from the module). The notification threshold must be less than the buffer size and greater than zero.
   b. Expired trend data will be deleted once a day at 2:30 am.

I/O Point Name	AI	AO	BI	BO	Default Trend?
Hot Deck Temperature	*				*
Cold Deck Temperature	*				*
Return Air Temperature	*				*
Mixed Air Temperature	*				*
Hot Water Valve Output		*			
Chilled Water Valve Output		*			
Economizer Output		*			
Smoke Detector			*		
Freeze Stat			*		
Hi Static			*		
Supply Fan Status			*		*
Return Fan Status			*		*
Supply Fan Start/Stop				*	
Return Fan Start/Stop				*	

Trend Name	An.	Bin.	Default Trend?
Run For	*		
Hot Deck Temperature Setpoint	*		*
Cold Deck Temperature Setpoint	*		*
Mixed Air Temperature Setpoint	*		*
Heating Requests	*		*
Cooling Requests	*		*
Run Time	*		
Occupied		*	
Run Command		*	

VAV Zone Control- HW Reheat

Occupied Mode

1. When zone temperature rises above its cooling setpoint (72°F) and cool air is available from the AHU, a cooling PID algorithm will modulate the control damper between the minimum occupied airflow and the maximum design cooling airflow until the zone is satisfied.
2. When the zone temperature is between the cooling setpoint and the heating setpoint, the zone controller will maintain the minimum occupied airflow, providing no less than the minimum required zone ventilation.
3. When zone temperature falls below its heating setpoint (70°F), a heating PID algorithm will use hot water coils to maintain the zone temperature at its heating setpoint. Additionally, if warm air is available from the AHU, the heating PID algorithm can modulate the control damper between the greater of the minimum occupied airflow or the minimum heating airflow and the maximum design heating airflow until the zone is satisfied.
    a. If the user chooses not to use supply air from the AHU for heating, the airflow will not modulate, but will remain at the greater of the minimum occupied airflow or the minimum heating airflow.
4. The zone will generate an alarm if the temperature remains 8°F higher than its cooling setpoint or 8°F lower than its heating setpoint for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.

Night Setback Mode

1. When the zone is unoccupied, the zone controller will raise the cooling setpoint to 85°F, drop the heating setpoint to 55°F, and drop the minimum required air flow to 0 CFM. As long as the temperature remains between the unoccupied cooling and heating setpoints, the zone controller will not send a run request to the AHU.
2. If the temperature rises above the unoccupied cooling setpoint or falls below the unoccupied heating setpoint, the zone controller will start the zone and send a request to the AHU to run as necessary to maintain the unoccupied cooling setpoint or the unoccupied heating setpoint.
    a. When the zone starts, the zone controller will provide 100% of the design heating or cooling (as appropriate) until the zone temperature rises above the heating setpoint or falls below the cooling setpoint by 2°F (the zone setpoint hysteresis).
    b. Once the zone temperature is within the unoccupied setpoints by at least the defined zone setpoint hysteresis the zone controller will cancel its heating or cooling request to the AHU and return to the unoccupied mode.
3. The zone will generate an alarm if the temperature remains higher than its cooling setpoint or lower than its heating setpoint for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.

Optimal Start Mode

1. The zone will calculate how long it will take to return from its unoccupied state to its occupied setpoint based on the heating or cooling capacity and the outside air temperature. The zone will then send a heating or cooling request to the AHU at the time necessary in order to ensure the desired zone conditions at occupancy.
2. The system will not start more than 4 hours before a scheduled occupancy.

Airflow Control

1. The damper will modulate to maintain the measured airflow at the desired setpoint, which is calculated based on the difference between zone temperature setpoint.
    a. The damper will not move for less than one second; if the damper position correction required to maintain the flow setpoint will take less than a one second damper movement, the damper will not move.
    b. If the measured flow falls below the minimum occupied or unoccupied airflow, the zone controller will send the damper a one-second open signal to ensure that the zone airflow will not fall below the required minimum.

Heating Control

1. If the zone PID heating algorithm is calling for auxiliary heat, the zone will modulate the heating valve to maintain zone temperature setpoint.
2. The user will be able to lock the signal to the heating valve and enter specific dates and times to enable and disable this lock.

Outgoing Requests

1. If the cooling PID calls for more than 90% of maximum design cooling airflow with a 40% hysteresis, the zone controller will send 1 request(s) to the AHU to lower the supply air temperature setpoint.
    a. If the zone temperature exceeds the zone temperature cooling setpoint by 2°F the zone controller will send 1 additional cooling request(s) to the AHU.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional cooling request(s) to the AHU.
2. If the heating PID calls for more than 90% of the maximum design heating airflow with a 40% hysteresis, the zone controller will send 1 request(s) to the AHU to raise the supply air temperature setpoint.
    a. If the zone temperature falls below the zone temperature heating setpoint by 2°F the zone controller will send 1 additional heating request(s) to the AHU.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional heating request(s) to the AHU.
3. If the zone is unoccupied and the zone is sending 1 or more heating requests of 1 or more cooling requests, the zone will send a request for the AHU to run for 15 minutes. The AHU will continue running for at least that amount of time after all unoccupied requests have been cancelled to prevent AHU cycling, particularly during optimal start.
4. If the zone is occupied, the controller will send a request for the AHU to run for the zone's remaining runtime. The zone will cap this runtime request at 30 minutes to prevent the AHU from running for longer than that amount f time if the signal is lost from the zones.
5. An occupied run request will take priority over an unoccupied run request.

Alarm Notification

1. The zone will indicate an alarm condition by showing red on the graphic display.
2. The zone controller will display alarms on the Event Page in WebCTRL.
    a. WebCTRL will notify the user with a printout, e-mail, sounds, or other reporting actions, depending on user configuration.
    b. The zone will also indicate alarms on the appropriate properties pages and on the logic display.

Alarm ID	Alarm Type	Alarm Conditions
ZTMP_HI	Off-Normal	Zone Temperature=Zone Setpoint + 4 for 5 min.
ZTMP_LO	Off-Normal	Zone Temperature=Zone Setpoint – 4 for 5 min.

Trends

1. All I/O points will be linked to a BACnet Trend Object, and additional trend objects will be provided as shown in the tables below.
    a. The zone controller will be able to record a trend sample every 10 minutes on each of the trend objects.
    b. The controller will save the most recent 144 samples of each trended point in the control module for viewing or printing.
    c. The user will be able to enable or disable trending of any of the points listed. Points marked with an asterisk will automatically be trended in the default configuration.
2. The user will be able to save any or all trend point data in a trend database for up to 1 year.
    a. The user will be able to set the buffer size (the number of data samples held in the module) and the notification threshold (the number of data samples to be accumulated in the module before requests data from the module). The notification threshold must be less than the buffer size and greater than zero.
    b. Expired trend data will be deleted once a day at 2:30 am.

I/O Point Name	A I	A O	B I	B O	Default Trend?
Override-through software	*				
Zone Temperature	*				*
Setpoint Adjust local sensor	*				
Zone Discharge Air Temp [if DAT sensor available]	*				*
CFM	*	*			*
% Cooling		*			
% Heating		*			
Hot Water Valve		*			*

Trend Object Name	An.	Bin.	Default Trend?
Heating Setpoint	*		*
Cooling Setpoint	*		*
Heating Capacity	*		
Cooling Capacity	*		
Auxiliary Heat	*		
Airflow Setpoint	*		*
Airflow	*		*
Damper Cycle Count	*		
Damper Full Open		*	
Damper Full Closed		*	
Heat Mode		*	*

Fan Coil Unit Control-CHW Control + HW Control

Run Conditions

1. When the zone becomes occupied the Fan Coil Unit (FCU) will run to provide the minimum ventilation.
   a. When the zone temperature is between the occupied cooling setpoint (72°F) and the occupied heating setpoint (70°F), the FCU will provide no mechanical heating or cooling.
2. When the zone is unoccupied, the controller will raise the zone temperature cooling setpoint to 85°F and drop the zone temperature heating setpoint to 65°F. As long as the zone temperature remains between the unoccupied cooling and heating setpoints, the FCU will not run.
3. The occupant will be able to adjust the zone temperature heating and cooling setpoints locally by ± 2°F.
4. The controller will generate an alarm if the zone temperature remains 4°F higher than its cooling setpoint for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
5. The controller will generate an alarm if the zone temperature remains 4° lower than its heating setpoint for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
6. The controller will generate an alarm if the discharge air temperature remains higher than 120°F for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
7. The controller will generate an alarm if the discharge air temperature remains lower than 45°F for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.

Optimal Start Mode

1. The zone will calculate how long it will take to return from its unoccupied state to its occupied setpoint based on the heating or cooling capacity and the outside air temperature. The zone will then adjust its effective setpoint at the time necessary in order to ensure the desired zone conditions at occupancy.
2. The system will not start more than 4 hours before a scheduled occupancy.

Fan Control

1. The FCU controller will turn on the fan if the FCU is called to run.
    a. When called to run, the fan will run for a minimum of 5 minutes.
    b. When the fan cycles off, it will remain off for a minimum of 5 minutes.
2. The FCU controller will track the supply fan's accumulated runtime expiration message.
    a. When runtime exceeds 10,000 hours, the controller will generate a runtime exipiration message.
    b. When runtime exceeds 10,000 hours , the controller will generate a filter runtime message.
3. If the supply fan proof indicates that the signal to the fan and the feedback from the fan have not matched for at least 30 seconds (feedback delay), the FCU controller will generate an alarm.
    a. When the run signal is on and the status signal has indicated that the fan is running for 5 seconds, the controller will indicate that the fan has flow.
    b. If the run signal commands the fan on and the stauts indicates that it is off, the controller will generate a supply fan fail alarm.
    c. The FCU controller will generate a hand operation alarm if the run signal commands the fan off and the fan feedback continues to indicate that the fan is running after the feedback delay.
    d. The controller will require that both the signal and feedback indicate that the supply fan is operating normally for 10 seconds (debounce time) before clearing an alarm.

Heating Control

1. If the outside air temperature is less than 55°F with a 2°F hysteresis and the outside air temperature is valid, the FCU controller will enable heating.
2. If the outside air temperature reading is not valid, the FCU controller will still enable heating.
    a. The user will be able to disable heating if the outside air temperature reading is not valid.
3. When zone temperature falls below its heating setpoint a heating PID algorithm will modulate the hot water valve to maintain the zone temperature at the zone temperature setpoint if heating is enabled and the FCU has flow.
    a. The user will be able to adjust the heating loop gain.
    b. The user will be able to lock the signal to the hot water valve and enter dates and times to enable and disable this lock.
4. If the FCU loses flow, the FCU controller will close the hot water valve.
5. If the discharge air temperature drops below 40°F, the FCU controller will begin to open the hot water valve to protect the coil. The controller will continue to open the valve linearly until the temperature drops to 35°F, when the hot water valve will be 100% open.
6. If the freeze stat trips, the FCU controller will open the hot water valve.
7. If the heating PID calls for more than 90% of the maximum design heating airflow with a 40% hysteresis, the zone controller will send 1 request(s) to the heat source (typically a boiler) to raise the hot water temperature setpoint.
    a. If the zone temperature falls below the zone temperature heating setpoint by 2°F the zone controller will send 1 additional heating request(s) to the heat source.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional heating request(s) to the heat source.
    c. The user will be able to send a request to the heat source to run whenever the FCU is running, regardless of the heating PID output.
8. When the FCU controller sends a heat request to the heat source, it will also indicate to the heat source how long the FCU anticipates it will be running.
    a. When the FCU is occupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early heat source shutdown on transition from unoccupied to occupied.
    b. If the zone is occupied, the controller will send a request for the heat source to run for the zone's remaining runtime. The zone will cap this runtime request at 30 minutes to prevent the heat source from running for longer than that amount of time if the signal is lost from the zones.

Cooling Control

1. If the outside air temperature is greater than 70°F with a 2°F hysteresis and the outside air temperature is valid, the FCU controller will enable cooling.
2. If the outside air temperature reading is not valid, the FCU controller will still enable cooling.
    a. The user will be able to disable cooling if the outside air temperature reading is not valid.
3. When zone temperature rises above its cooling setpoint a cooling PID algorithm will modulate the chilled water valve to maintain the zone temperature at the zone temperature setpoint if cooling is enabled and the FCU has flow.
    a. The user will be able to adjust the cooling loop gain.
4. The user will be able to lock the signal to the chilled water valve and enter dates and times to enable and disable this lock.
5. If the FCU loses any of its enabling conditions, the FCU controller will close the chilled water valve.
6. If the cooling PID is calling for more than 90% with a 40% hysteresis, the FCU controller will send 1 request(s) to the cooling source (typically a chiller) to lower the chilled water temperature.
    a. If the zone temperature rises above the zone temperature heating setpoint by 2°F the zone controller will send 1 additional cooling request(s) to the cooling source.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional cooling request(s) to the cooling source.
    c. The user will be able to send a request to the cooling source to run whenever the FCU is running, regardless of the cooling PID output.
7. When the FCU controller sends a cool request to the cooling source, it will also indicate to the cooling source how long the FCU anticipates it will be running.
    a. When the FCU is unoccupied, the controller will send a minimum "run for" signal for 15 minutes to prevent cycling during night setback and to prevent early cooling source shutdown on transition from unoccupied to occupied.
    b. If the zone is occupied, the controller will send a request for the cool source to run for the zone's remaining runtime. The zone will cap this runtime request at 30 minutes to prevent the cool source from running for longer than that amount of time if the signal is lost from the zones.

Alarm Notification

1. The zone will indicate an alarm condition by showing red on the graphic display.
2. The zone controller will display alarms on the Event Page in WebCTRL.
    a. WebCTRL will notify the user with a printout, e-mail, sounds, or other reporting actions, depending on user configuration.
    b. The zone will also indicate alarms on the appropriate properties pages and on the logic display.

Alarm ID	Alarm Type	Alarm Conditions
SF_FAIL	Change of State	Run=on, Status=off
SF_HAND	Change of State	Run=off, Status=on
SF_RNTM	Change of State	SF Runtime>10000 hrs.
ZTMP_HI	Off-Normal	Zone Temp>(Zone Temp Setpoint + 8°F) for 5 min.
ZTMP_LO	Off-Normal	Zone Temp<(Zone Temp Setpoint - 8°F) for 5 min.
DAT_HI	Off-Normal	DAT>120°F for 5 min.
DAT_LO	Off-Normal	DAT<45°F for 5 min.

Trends

1. All I/O points will be linked to a BACnet Trend Object, and additional trend objects will be provided as shown in the tables below.
   a. The zone controller will be able to record a trend sample every 10 minutes on each of the trend objects.
   b. The controller will save the most recent 144 samples of each trended point in the control module for viewing and printing.
   c. The user will be able to enable or disable trending of any of the points listed. Points marked with an asterisk will automatically be trended in the default configuration.
2. The user will be able to save any or all trend point data in a trend database for up to 1 year.
   a. The user will be able to set the buffer size (the number of data samples held in the module) and the notification threshold (the number of data samples to be accumulated in the module before WebCTRL requests data from the module). The notification threshold must be less than the buffer size and greater than zero.
   b. Expired trend data will be deleted once a day at 2:30 am.

I/O Point Name	**AI**	**AO**	**BI**	**BO**	**Default Trend?**
Override	*				
Zone Temp	*				*
Setpoint Adjust	*				
Discharge Air Temperature	*				*
*Hot Water Valve Output (AO)		*			
*Chilled Water Valve Output (AO)		*			
Supply Fan Status			*		*
Supply Fan Start/Stop				*	

*NOTE: Delete whichever outputs you are NOT using.

Trend Object Name	**An.**	**Bin.**	**Default Trend?**
Heating Setpoint	*		*
Cooling Setpoint	*		*
Hot Water Valve %	*		*
Chilled Water Valve %	*		*
Heating Capacity	*		
Cooling Capacity	*		

Unit Ventilator Unit Control –CHW Control + HW Control

Run Conditions

1. When the zone becomes occupied the Unit Ventilator unit (UV) will run to provide minimum ventilation.
    a. When the zone temperature is between the occupied cooling setpoint (72°F) and the occupied heating setpoint (70°F), the UV will provide no mechanical heating or cooling.
2. When the zone is unoccupied, the controller will raise the zone temperature cooling setpoint to 85°F and drop the zone temperature heating setpoint to 65°F. As long as the zone temperature remains between the unoccupied cooling and heating setpoints, the UV will not run.
3. The occupant will be able to adjust the zone temperature heating and cooling setpoints locally by ± 2°F.
4. The controller will generate an alarm if the zone temperature remains 4°F higher than its cooling setpoint for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
5. The controller will generate an alarm if the zone temperature remains 4°F lower than its heating setpoint for 5 mintues. This alarm will not be enabled until the zone has been running for 30 minutes.
6. The controller will generate an alarm if the discharge air temperature remains higher than 120°F for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.
7. The controller will generate an alarm if the discharge air temperature remains lower than 45°F for 5 minutes. This alarm will not be enabled until the zone has been running for 30 minutes.

Optimal Start Mode

1. The zone will calculate how long it will take to return from its unoccupied state to its occupied setpoint based on the heating or cooling capacity and the outside air temperature. The zone will then adjust its effective setpoint at the time necessary in order to ensure the desired zone conditions at occupancy.
2. The system will not start more than 4 hours before a scheduled occupancy.

Fan Control

1. The UV controller will turn on the fan if the UV is called to run.
    a. When called to run, the fan will run for a minimum of 5 minutes.
    b. When the fan cycles off, it will remain off for a minimum of 5 minutes.
2. The UV controller will track the supply fan's accumulated runtime.
    a. When runtime exceeds 10,000 hours, the controller will generate a runtime expiration message.
    b. When runtime exceeds 10,000 hours, the controller will generate a filter runtime message.
3. If the supply fan proof indicates that the signal to the fan and the feedback from the fan have not matched for at least 30 seconds (feedback delay), the UV controller will generate an alarm.
    a. When the run signal is on and the status signal has indicated that he fan is running for 5 seconds, the controller will indicate that the fan has flow.
    b. If the run signal commands the fan on and the status indicates that it is off, the controller will generate a supply fan fail alarm.
    c. The UV controller will generate a hand operation alarm if the run signal commands the fan off and the fan feedback continues to indicate that the fan is running after the feedback delay.
    d. The controller will require that both the signal and feedback indicate that the supply fan is operating normally for 10 seconds (debounce time) before clearing an alarm.

Heating Control

1. If the outside air temperature is less than 55°F with a 2°F hysteresis and the outside air temperature is valid, the UV controller will enable heating.
2. If the outside air temperature reading is not valid, the UV controller will still enable heating.
    a. The user will be able to disable heating if the outside air temperature reading is not valid.
3. When zone temperature falls below its heating setpoint a heating PID algorithm will modulate the hot water valve to maintain the zone temperature at the zone temperature setpoint if heating is enabled.
    a. The user will be able to adjust the heating loop gain.
    b. The user will be able to lock the signal to the hot water valve and enter dates and times to enable and disable this lock.
4. If the UV loses flow, the UV controller will close the hot water valve.

5. If the discharge air temperature drops below 40°F, the UV controller will begin to open the hot water valve to protect the coil. The controller will continue to open the valve linearly until the temperature drops to 35°F, when the hot water valve will be 100% open.
6. If the freeze stat trips, the UV controller will open the hot water valve.
7. If the heating PID calls for more than 90% of the maximum design heating airflow with a 40% hysteresis, the zone controller will send 1 request(s) to the heat source (typically a boiler) to raise the hot water temperature setpoint.
    a. If the zone temperature falls below the zone temperature heating setpoint by 2°F the zone controller will send 1 additional heating request(s) to the heat source.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional heating request(s) to the heat source.
    c. The user will be able to send a request to the heat source to run whenever the FCU is running, regardless of the heating PID output.
8. When the UV controller sends a heat request to the heat source, it will also indicate to the heat source how long the UV anticipates it will be running.
    a. When the UV is unoccupied, the controller will send a minimum "run for" signal of 15 minutes to prevent cycling during night setback and to prevent early heat source shutdown on transition from unoccupied to occupied.
    b. If the zone is occupied, the controller will send a request for the heat source to run for the zone's remaining runtime. The zone will cap this runtime request at 30 minutes to prevent the heat source from running for longer than that amount of time if the signal is lost from the zones.

Cooling Control

1. If the outside air temperature is greater than 70°F with a 2°F hysteresis and the outside air temperature is valid, the UV controller will enable cooling.
2. If the outside air temperature reading is not valid, the UV controller will still enable cooling.
    a. The user will be able to disable cooling if the outside air temperature reading is not valid.
3. When zone temperature rises above its cooling setpoint a cooling PID algorithm will modulate the chilled water valve to maintain the zone temperature at the zone temperature setpoint if cooling is enabled and the UV has flow.
    a. The user will be able to adjust the cooling loop gain.
4. The user will be able to lock the signal to the chilled water valve and enter dates and times to enable and disable this lock.
5. If the UV loses any of its enabling conditions, the UV controller will close the chilled water valve.
6. If the cooling PID is calling for more than 90% with a 40% hysteresis, the UV controller will send 1 request(s) to the cooling source (typically a chiller) to lower the chilled water temperature.
    a. If the zone temperature rises above the zone temperature heating setpoint by 2°F the zone controller will send 1 additional cooling request(s) to the cooling source.
    b. If the zone temperature reaches an alarm condition, the zone controller will send 1 additional cooling request(s) to the cooling source.
    c. The user will be able to send a request to the cooling source to run whenever the UV is running, regardless of the cooling PID output.
7. When the UV controller sends a cool request to the cooling source, it will also indicate to the cooling source how long the UV anticipates it will be running.
    a. When the UV is unoccupied, the controller will send a minimum "run for" signal for 15 minutes to prevent cycling during night setback and to prevent early cooling source shutdown on transition from unoccupied to occupied.
    b. If the zone is occupied, the controller will send a request for the cool source to run for the zone's remaining runtime. The zone will cap this runtime request at 30 minutes to prevent the cool source from running for longer than that amount of time if the signal is lost from the zones.

Alarm Notification

    a. The zone will indicate an alarm condition by showing red on the graphic display.
    b. The zone controller will display alarms on the Event Page in the DDC software.
    c. The DDC software will notify the user with at printout, e-mail, sounds, or other reporting actions, depending on user configuration.
    d. The zone will also indicate alarms on the appropriate properties pages and on the logic display.

Alarm ID	Alarm Type	Alarm Conditions
SF_FAIL	Change of State	Run=on, Status=off
SF_HAND	Change of State	Run=off, Status=on
SF_RNTM	Change of State	SF Runtime>10000 hrs.
ZTMP_HI	Off-Normal	Zone Temp>(Zone Temp Setpoint + 8°F) for 5 min.
ZTMP_LO	Off-Normal	Zone Temp<(Zone Temp Setpoint - 8°F) for 5 min.
DAT_HI	Off-Normal	DAT>120°F for 5 min.
DAT_LO	Off-Normal	DAT<45°F for 5 min.

Trends

1. All I/O points will be linked to a BACnet Trend Object, and additional trend objects will be provided as shown in the tables below.
2. The zone controller will be able to record a trend sample every 10 minutes on each of the trend objects.
3. The controller will save the most recent 288 samples of each trended point in the control module for view or printing.
    a. The user will be able to enable or disable trending of any of the points listed. Points marked with an asterisk will automatically be trended in the default configuration.
    b. The user will be able to save any or all trend point data in a trend database for up to 1 year.
    c. The user will be able to set the buffer size (the number of data samples held in the module) and the notification threshold (the number of data samples to be accumulated in the module before the DDC software requests data from the module). The notification threshold must be less than the buffer size and greater than zero.
4. Expired trend data will be deleted once a day at 2:30 am.

I/O Point Name	A I	A O	B I	B O	Default Trend?
Override	*				
Zone Temp	*				*
Setpoint Adjust	*				
Discharge Air Temperature	*				*
**Hot Water Valve Output (AO)		*			
**Chilled Water Valve Output (AO)		*			
Supply Fan Status			*		*
Supply Fan Start/Stop				*	

**NOTE: Delete whichever outputs you are NOT using.

Trend Object Name	An.	Bin.	Default Trend?
Heating Setpoint	*		*
Cooling Setpoint	*		*
Hot Water Valve %	*		*
Chilled Water Valve %	*		*
Heating Capacity	*		
Cooling Capacity	*		

Air Cooled Helical Rotary Chiller(s) System Control

A. General – The standalone microprocessor based chiller control panel shall monitor and control the chiller(s) in a standalone mode or as directed by the chiller sequencing software.

The chiller sequencing software shall perform the following control strategies, provide the points as listed on the chiller point list and support their specified monitoring and diagnostics.

B. System Scheduling – The chiller sequencing software will start the chiller system based upon 8 day (7+ Holiday) time of day schedule.
The system shall also start in response to a binary contact signal from an external source such as the building control system.

C. Chiller Sequencing – The chiller sequencing software will start and stop system water pumps and chillers based upon system load.

1. When the chilled water system is enabled the chiller system control will:
    a. Start the system chilled water pump.
    b. Start the lead chiller chilled water pump and prove flow through the evaporator.
    c. Start the lead chiller after chilled water is proven.

Decoupled Chiller Plant Control

2. The chiller sequencing software shall consider starting another chiller whenever there is deficit flow in the primary-secondary decoupler (bypass) pipe.
   The chiller sequencing software shall determine when there is deficit flow by measuring the system and chiller return water decoupler water temperatures.
   Mixing equations shall then be used to calculate the deficit flow volume.
   When deficit flow exists continuously for an operator-specified length of time, the chiller sequencing software shall initiate the start of the next chiller in the sequence.
    a. Lag chillers start in a similar matter to the lead chiller start sequence.
    b. The chiller sequencing software will unload operating chillers prior to starting a lag chiller.
    c. The BAS shall control each chiller's setpoint to equalize the chiller unloading and meet system demands as the system load varies.
3. The chiller sequencing software shall consider stopping another chiller whenever the excess flow in the decoupler (bypass) pipe exceeds 120 percent of the next off chiller's flow.
   The chiller sequencing software shall determine the quantity of excess flow by measuring the system and chiller supply and return water and decoupler water temperatures. Mixing equations shall then be used to calculate the deficit flow volume.
   When the calculated excess flow exceeds 120 percent of the next off chiller's flow continuously for 15 minutes, the chiller sequencing software shall initiate the shutdown of the next chiller in the sequence. The excess flow setpoint and duration shall be easily modifiable by the chiller systems operator.
    a. The chiller sequencing software will not shutdown the chiller pump until it has confirmed that the chiller compressor has shutdown.
4. The chiller sequencing software shall control individual chiller setpoints to the system supply water temperature setpoint. The system setpoint shall be 45°F and editable by the operator. Chilled water reset shall not be used because of its affect on secondary chilled water pumping power.
5. Prior to the start of another chiller all operating chillers shall be unloaded. This is done to prevent flow disturbances caused by the starting of another pump from affecting chiller operation. Following confirmation of the additional chiller operation all chillers shall be allowed to reload.
6. The chiller sequencing software shall optimize operation of a heat recovery chiller by base loading that chiller. It shall be operated in a first on last off sequence while continuing to automatically rotate the sequence of other chillers.
7. The chiller sequencing software shall optimize operation of a system with a lower efficiency of backup chiller by peak loading that chiller. It shall be operated in a last on first off sequence while continuing to automatically rotate the sequence of other chillers.
8. The chiller sequencing software shall optimize operation of a system with a swing or trim chiller by alternating its operations with the larger chillers in the system. It shall be operated in as first on be alternated off and back on as the system load increased and other chillers are brought on line. The other chillers shall continue to automatically rotate sequence.

9. Upon sensing a chiller failure the chiller sequencing software shall lockout that chiller and pump and immediately initiates the start of the next chiller in the rotation sequence.
10. Automatic rotation of chiller operation will equalize chiller run time.
    a. Rotation shall be initiated based on an operator entered day interval or by the cycling of a binary point.
    b. The method of sequence shall be operator selectable. Chillers maybe forced into a new rotation sequence by cycling chillers at the time of initiation. Alternatively chiller cycling caused by normal system load fluctuations shall cause the chillers to change rotation sequence therefore eliminating unnecessarily chiller cycling.
11. Chiller Soft Start-The chiller sequencing software will provide a user adjustable loading time at system start-up. This prevents the unnecessary operation of chillers and limits system electrical demand during chilled water loop pulldown.
12. Chilled Water Reset- Provide reset of the chilled water supply temperature setpoint based on [return chilled water] [ambient temperature] [other monitored point such as selected space temperature]. The no reset design system water setpoint shall be 45°F with a reset rate of 1°F of reset in system supply water setpoint per 2°F of drop in reset sensor temperature. The rest parameters shall be user selectable.
13. Chiller Demand Limiting- as part of the demand limiting scheme on the building, the chiller sequencing software shall be able to monitor and reduce peak power demand through the limiting of chiller system capacity.
14. Chiller Status Report-Provide an operating status report for each chiller. The report(s) shall provide the present status of all binary information and for analog information present value, today's average, and the month to date average for the following information to provide the operator with critical chiller operating data. The data shall be obtained through on-board LON or BACnet interface card.
    a. Compressor On/Off Status
    b. Compressor Starts/Run Hours- Compressor A, B
    c. Phase 1/2/3 Percent RLA- Compressor A, B
    d. Active Chiller Diagnostics or Alarms
    e. Leaving Chilled Water Temperature
    f. Entering Chilled Water Temperature
    g. Water Heater Entering/Leaving Temperature
    h. Chilled Water Setpoint
    i. Condenser Fan Percent Airflow- Circuit 1, 2
    j. Refrigerant Temperature Evaporator/Condenser – Circuit 1, 2
    k. Operating Mode
    l. Chiller Model and Serial Number
    m. Percent RLA/Percent Current Limit
    n. Outside Air Temperature
    o. Zone Temperature (optional)

Software Licensing Agreements

The owner shall sign a copy of the manufacturer's standard software and firmware licensing agreement. Such license shall grant unlimited use of all programs and application software to Owner as defined by the manufacturer's license agreement.

The Facilities Management and Controls System (FMCS) shall be comprised of Network Area Controller or Controllers (NAC) within each facility. The NAC shall connect to the owner's local or wide area network, depending on configuration. Access to the system, either locally in each building, or remotely from a central site or sites, shall be accomplished through standard Web browsers, via the Internet and/or local area network. Each NAC shall communicate to LonMark/LonTalk (IDC) and/or BACnet (IBC) controllers and other open and legacy protocol systems/devices provided under Division 15 or Division 16.

The Facilities Management and Control System shall be based on the Niagara Framework (or "Niagara"), a Java-based framework developed by Tridium.

Additional Points

Cleaning

1. The contractor shall clean up all debris resulting from his or her activities daily. The contractor shall remove all cartons, containers, crates, etc. under his control as soon as their contents have been removed. At the completion of work in any area, the Contractor shall clean all of his/her work, equipment, etc., making it free from dirt and debris, etc.
2. At the completion of work, all equipment furnished under this Section shall be checked for paint damage, and any factor-finished paint that has been damaged shall be repaired to match the adjacent areas. Any metal cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

Protection

1. The Contractor shall protect all work and material from damage by his/her work or workers, and shall be liable for all damage thus caused.
2. The Contractor shall be responsible for his/her work and equipment until finally inspected, tested, and accepted. The Contractor shall protect his/her work against theft or damage, and shall carefully store material and equipment received on-site that is not immediately installed. The Contractor shall close all open ends of work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

Control System Design

The control system shall be designed such that mechanical equipment will be able to operate under stand-alone control. In general, the operation of any controllers on the network shall not rely on any other controller for its operation. Functionality such as scheduling and trending shall be resident in each and every controller including both programmable and configurable controllers regardless of where they reside on the network. System controllers that require a master computer, or a dedicated function module such a schedule, trend, or data-logging module are not acceptable, although function specific modules may be used to supplement the functionality resident in each controller. As such, in the event of a network communication failure, or the loss of any other controller, the control system shall continue to independently operate under control of the resident program stored in nonvolatile memory as detailed herein. In such a case, each individual controller shall continue to trend data commensurate with the data storage capabilities of each controller until a network connection can be restored.

INSTRUCTIONS TO BIDDERS

1. **READ, REVIEW AND COMPLY:** It shall be the bidder's responsibility to read this entire document, review all enclosures and attachments, and comply with all requirements specified herein.

2. **NOTICE TO BIDDERS:** All bids are subject to the provisions of the Instructions to Bidders, special terms and conditions specific to this Invitation for Bids, the specifications, and the North Carolina General Contract Terms and Conditions.
   Union County Public Schools objects to and will not evaluate or consider any additional terms and conditions submitted with a bidder response. This applies to any language appearing in or attached to the document as part of the bidder's response. DO NOT ATTACH ANY ADDITIONAL TERMS AND CONDITIONS.
   By execution and delivery of this document, the bidder agrees that any additional terms and conditions, whether submitted purposely or inadvertently, shall have no force or effect.

3. **DEFINITIONS:**
   - **BIDDER:** Company, firm, corporation, partnership, individual, etc., submitting a response to an Invitation for Bids.
   - **TERM CONTRACT:** A contract generally intended to cover all normal requirements for a commodity for a specified period of time based on estimated quantities only.
   - **STATEWIDE TERM CONTRACT:** A Term Contract for all agencies, unless exempted by statute, rule, or special term and condition specific to this bid.
   - **AGENCY SPECIFIC TERM CONTRACT**: A Term Contract for a specific agency.
   - **OPEN MARKET CONTRACT:** A contract for the purchase of a commodity not covered by a term contract.

4. **EXECUTION:** Failure to sign under EXECUTION section will render bid invalid.

5. **ORDER OF PRECEDENCE:** In cases of conflict between specific provisions in this bid, the order of precedence shall be (1) special terms and conditions specific to this bid, (2) specifications, (3) North Carolina General Contract Terms and Conditions, and (4) Instructions to Bidders.

6. **TIME FOR CONSIDERATION:** Unless otherwise indicated on the first page of this document, bidder's offer shall be valid for 45 days from the date of bid opening. Preference may be given to bids allowing not less than 45 days for consideration and acceptance.

7. **PROMPT PAYMENT DISCOUNTS:** Bidders are urged to compute all discounts into the price offered. If a prompt payment discount is offered, it will not be considered in the award of the contract except as a factor to aid in resolving cases of identical prices.

8. **SPECIFICATIONS:** Any deviation from specifications indicated herein must be clearly pointed out; otherwise, it will be considered that items offered are in strict compliance with these specifications, and bidder will be held responsible therefore. Deviations shall be explained in detail. **The bidder shall not construe this paragraph as inviting deviation or implying that any deviation will be acceptable.**

9. **INFORMATION AND DESCRIPTIVE LITERATURE:** Bidder is to furnish all information requested and in the spaces provided in this document. Further, if required elsewhere in this bid, each bidder must submit with their bid sketches, descriptive literature and/or complete specifications covering the products offered. Reference to literature submitted with a previous bid will not satisfy this provision. Bids which do not comply with these requirements will be subject to rejection.

10. **RECYCLING AND SOURCE REDUCTION:** It is the policy of this State to encourage and promote the purchase of products with recycled content to the extent economically practicable, and to purchase items which are reusable, refillable, repairable, more durable, and less toxic to the extent that the purchase or use is practicable and cost-effective.
    We also encourage and promote using minimal packaging and the use of recycled/recyclable products in the packaging of commodities purchased. However, no sacrifice in quality of packaging will be acceptable. The company remains responsible for providing packaging that will protect the commodity and contain it for its intended use.
    Companies are strongly urged to bring to the attention of purchasers those products or packaging they offer which have recycled content and that are recyclable.

11. **CLARIFICATIONS/INTERPRETATIONS:** Any and all questions regarding this document must be addressed to the purchaser named on the cover sheet of this document. Do not contact the user directly. Any and all revisions to this document shall be made only by written addendum. The bidder is cautioned that the requirements of this bid can be altered only by written addendum and that verbal communications from whatever source are of no effect.

12. **ACCEPTANCE AND REJECTION:** Union County Public Schools reserves the right to reject any and all bids, to waive any informality in bids and, unless otherwise specified by the bidder, to accept any item in the bid. If either a unit price or extended price is obviously in error and the other is obviously correct, the incorrect price will be disregarded.

13. **REFERENCES:** Union County Publlic Schools reserves the right to require a list of users of the exact item offered. Union County Public Schools may contact these users to determine acceptability of the bid. Such information may be considered in the evaluation of the bid.

14. **TAXES:**
    - **FEDERAL:** All agencies participating in this contract are exempt from Federal Taxes, such as excise and transportation. Exemption forms submitted by the contractor will be executed and returned by the using agency.
    - **OTHER:** Prices offered are not to include any personal property taxes, nor any sales or use tax (or fees) unless required by the North Carolina Department of Revenue.

15. **AWARD OF CONTRACT:** As directed by statute, qualified bids will be evaluated and acceptance may be made of the lowest and best bid most advantageous to Union County Public Schools as determined upon consideration of such factors as: prices offered; the quality of the articles offered; the general reputation and performance capabilities of the bidders; the substantial conformity with the specifications and other conditions set forth in the bid; the suitability of the articles for the intended use; the related services needed; the date or dates of delivery and performance; and such other factors deemed by Union County Public Schools to be pertinent or peculiar to the purchase in question. Unless otherwise specified by Union County Public Schools or the bidder, Union County Public Schools reserves the right to accept any item or group of items on a multi-item bid.
    In addition, on TERM CONTRACTS, Union County Public Schools reserves the right to make partial, progressive or multiple awards: where it is advantageous to award separately by items; or where more than one supplier is needed to provide the contemplated requirements as to quantity, quality, delivery, service, geographical areas; other factors deemed by Union County Public Schools to be pertinent or peculiar to the purchase in question.

16. **HISTORICALLY UNDERUTILIZED BUSINESSES:** Pursuant to General Statute 143-48 and Executive Order #150, Union County Public Schools invites and encourages participation in this procurement process by businesses owned by minorities, women, disabled, disabled business enterprises and non-profit work centers for the blind and severely disabled.

17. **CONFIDENTIAL INFORMATION:** As provided by statute and rule, the Union County Public Schools will consider keeping trade secrets which the bidder does not wish disclosed confidential. Each page shall be identified in boldface at the top and bottom as "CONFIDENTIAL" by the bidder. Cost information shall not be deemed confidential. In spite of what is labeled as a trade secret, the determination whether it is or not will be determined by North Carolina law.

18. **SAMPLES:** Sample of items, when required, must be furnished as stipulated herein, free of expense, and if not destroyed will, upon request be returned at the bidder's expense. Request for the return of samples must be made within 10 days following date of bid opening. Otherwise the samples will become Union County Public Schools property. Each individual sample must be labeled with the bidder's name, bid number, and item number. A sample on which an award is made, will be retained until the contract is completed, and then returned, if requested, as specified above.

19. **PROTEST PROCEDURES:** When a bidder wants to protest a contract awarded by the Secretary of Administration or by an agency over $25,000 resulting from this solicitation, they must submit a written request to the State Purchasing Officer at Purchase and Contract, 1305 Mail Service Center, Raleigh, NC 27699-1305. This request must be received in the Division of Purchase and Contract within thirty (30) consecutive calendar days from the date of the contract award. When a bidder wants to protest a contract awarded by an agency or university resulting from this solicitation that is over $10,000 but less than $25,000 for any agency, or any contract awarded by a university, they must submit a written request to the issuing procurement officer at the address of the issuing agency. This request must be received in that office within thirty (30) consecutive calendar days from the date of the contract award. Protest letters must contain specific reasons and any supporting documentation for the protest. Note: Contract award notices are sent only to those actually awarded contracts, and not to every person or firm responding to this solicitation. Bid status and Award notices are posted on the Internet at http://www.state.nc.us/pandc/. All protests will be handled pursuant to the North Carolina Administrative Code, Title 1, Department of Administration, Chapter 5, Purchase and Contract, Section 5B.1519. (See Protest Information at http://www.doa.state.nc.us/PandC/protests.pdf for more information.)

20. **MISCELLANEOUS:** Masculine pronouns shall be read to include feminine pronouns, and the singular of any word or phrase shall be read to include the plural and vice versa.

21. **RECIPROCAL PREFERENCE:** G.S. 143-59 establishes a reciprocal preference law to discourage other states from applying in-state preferences against North Carolina's resident bidders. The "Principal Place of Business" is defined as the principal place from which the trade or business of the bidder is directed or managed.

NORTH CAROLINA GENERAL CONTRACT TERMS AND CONDITIONS

1. **DEFAULT AND PERFORMANCE BOND:** In case of default by the contractor, Union County Public Schools may procure the articles or services from other sources and hold the contractor responsible for any excess cost occasioned thereby. Union County Public Schools reserves the right to require performance bond or other acceptable alternative guarantees from successful bidder without expense to Union County Public Schools .

   In addition, in the event of default by the Contractor under this contract, the State may immediately cease doing business with the Contractor, immediately terminate for cause all existing contracts the State has with the Contractor, and de-bar the Contractor from doing future business with the State.

   Upon the Contractor filing a petition for bankruptcy or the entering of a judgment of bankruptcy by or against the Contractor, the State may immediately terminate, for cause, this contract and all other existing contracts the Contractor has with the State, and de-bar the Contractor from doing future business with the State.

2. **GOVERNMENTAL RESTRICTIONS:** In the event any Governmental restrictions are imposed which necessitate alteration of the material, quality, workmanship or performance of the items offered prior to their delivery, it shall be the responsibility of the contractor to notify, in writing, the issuing purchasing office at once, indicating the specific regulation which required such alterations. Union County Public Schools reserves the right to accept any such alterations, including any price adjustments occasioned thereby, or to cancel the contract.

3. **AVAILABILITY OF FUNDS:** Any and all payments to the contractor are dependent upon and subject to the availability of funds to the agency for the purpose set forth in this agreement.

4. **TAXES:** Any applicable taxes shall be invoiced as a separate item.

   G.S. 143-59.1 bars the Secretary of Administration from entering into contracts with vendors if the vendor or its affiliates meet one of the conditions of G. S. 105-164.8(b) and refuse to collect use tax on sales of tangible personal property to purchasers in North Carolina. Conditions under G. S. 105-164.8(b) include: (1) Maintenance of a retail establishment or office, (2) Presence of representatives in the State that solicit sales or transact business on behalf of the vendor and (3) Systematic exploitation of the market by media-assisted, media-facilitated, or media-solicited means. By execution of the bid document the vendor certifies that it and all of its affiliates, (if it has affiliates), collect(s) the appropriate taxes.

5. **SITUS:** The place of this contract, its situs and forum, shall be North Carolina, where all matters, whether sounding in contract or tort, relating to its validity, construction, interpretation and enforcement shall be determined.

6. **GOVERNING LAWS:** This contract is made under and shall be governed and construed in accordance with the laws of the State of North Carolina.

7. **INSPECTION AT CONTRACTOR'S SITE:** Union County Public Schools reserves the right to inspect, at a reasonable time, the equipment/item, plant or other facilities of a prospective contractor prior to contract award, and during the contract term as necessary for Union County Public Schools determination that such equipment/item, plant or other facilities conform with the specifications/requirements and are adequate and suitable for the proper and effective performance of the contract.

8. **PAYMENT TERMS:** Payment terms are Net not later than 30 days after receipt of correct invoice or acceptance of goods, whichever is later. The using agency is responsible for all payments to the contractor under the contract. Payment by some agencies may be made by procurement card and it shall be accepted by the contractor for payment if the contractor accepts that card (Visa, Mastercard, etc.) from other customers. If payment is made by procurement card, then payment may be processed immediately by the contractor.

9. **AFFIRMATIVE ACTION:** The contractor will take affirmative action in complying with all Federal and State requirements concerning fair employment and employment of people with disabilities, and concerning the treatment of all employees without regard to discrimination by reason of race, color, religion, sex, national origin or disability.

10. **CONDITION AND PACKAGING:** Unless otherwise provided by special terms and conditions or specifications, it is understood and agreed that any item offered or shipped has not been sold or used for any purpose and shall be in first class condition. All containers/packaging shall be suitable for handling, storage or shipment.

11. **STANDARDS:** All manufactured items and/or fabricated assemblies subject to operation under pressure, operation by connection to an electric source, or operation involving a connection to a manufactured, natural, or LP gas source shall be constructed and approved in a manner acceptable to the appropriate state inspector which customarily requires the label or re-examination listing or identification marking of the appropriate safety standard organization; such as the American Society of Mechanical Engineers for pressure vessels; the Underwriters Laboratories and /or National Electrical Manufacturers' Association for electrically operated assemblies; or the American Gas Association for gas operated assemblies, where such approvals of listings have been established for the type of device offered and furnished. Further, all items furnished shall meet all requirements of the Occupational Safety and Health Act (OSHA), and state and federal requirements relating to clean air and water pollution.

12. **PATENT:** The contractor shall hold and save Union County Public Schools , its officers, agents and employees, harmless from liability of any kind, including costs and expenses, on account of any copyrighted material, patented or unpatented invention, articles, device or appliance manufactured or used in the performance of this contract, including use by the government.

13. **ADVERTISING:** Contractor agrees not to use the existence of this contract or the name of the State of North Carolina as part of any commercial advertising.

14. **ACCESS TO PERSONS AND RECORDS:** The State Auditor shall have access to persons and records as a result of all contracts or grants entered into by State agencies or political subdivisions in accordance with General Statute 147-64.7.

15. **ASSIGNMENT:** No assignment of the contractor's obligations nor the contractor's right to receive payment hereunder shall be permitted.
However, upon written request approved by the issuing purchasing authority and solely as a convenience to the contractor, Union County Public Schools may:
a. Forward the contractor's payment check directly to any person or entity designated by the contractor, and
b. Include any person or entity designated by contractor as a joint payee on the contractor's payment check.
In no event shall such approval and action obligate the State to anyone other than the contractor and the contractor shall remain responsible for fulfillment of all contract obligations.

16. **INSURANCE:**
COVERAGE - During the term of the contract, the contractor at its sole cost and expense shall provide commercial insurance of such type and with such terms and limits as may be reasonably associated with the contract. As a minimum, the contractor shall provide and maintain the following coverage and limits:
a. **Worker's Compensation** - The contractor shall provide and maintain Worker's Compensation Insurance, as required by the laws of North Carolina, as well as employer's liability coverage with minimum limits of $150,000.00, covering all of contractor's employees who are engaged in any work under the contract. If any work is sublet, the contractor shall require the subcontractor to provide the same coverage for any of his employees engaged in any work under the contract.
b. **Commercial General Liability** - General Liability Coverage on a Comprehensive Broad Form on an occurrence basis in the minimum amount of $500,000.00 Combined Single Limit. (Defense cost shall be in excess of the limit of liability.)
c. **Automobile** - Automobile Liability Insurance, to include liability coverage, covering all owned, hired and non-owned vehicles, used in connection with the contract. The minimum combined single limit shall be $150,000.00 bodily injury and property damage; $150,000.00 uninsured/under insured motorist; and $1,000.00 medical payment.
REQUIREMENTS: Providing and maintaining adequate insurance coverage is a material obligation of the contractor and is of the essence of this contract. All such insurance shall meet all laws of the State of North Carolina. Such insurance coverage shall be obtained from companies that are authorized to provide such coverage and that are authorized by the Commissioner of Insurance to do business in North Carolina. The contractor shall at all times comply with the terms of such insurance policies, and all requirements of the insurer under any such insurance policies, except as they may conflict with existing North Carolina laws or this contract. The limits of coverage under each insurance policy maintained by the contractor shall not be interpreted as limiting the contractor's liability and obligations under the contract.

17. **GENERAL INDEMNITY:** The contractor shall hold and save the State, its officers, agents, and employees, harmless from liability of any kind, including all claims and losses accruing or resulting to any other person, firm, or corporation furnishing or supplying work, services, materials, or supplies in connection with the performance of this contract, and from any and all claims and losses accruing or resulting to any person, firm, or corporation that may be injured or damaged by the contractor in the performance of this contract and that are attributable to the negligence or intentionally tortuous acts of the contractor provided that the contractor is notified in writing within 30 days that the State has knowledge of such claims. The contractor represents and warrants that it shall make no claim of any kind or nature against the State's agents who are involved in the delivery or processing of contractor goods to the State. The representation and warranty in the preceding sentence shall survive the termination or expiration of this contract.

18. **ELECTRONIC PROCUREMENT (APPLIES TO ALL CONTRACTS THAT INCLUDE E-PROCUREMENT AND ARE IDENTIFIED AS SUCH IN THE BODY OF THE SOLICITATION DOCUMENT):** Purchasing shall be conducted through the Statewide E-Procurement Service. The State's third party agent shall serve as the Supplier Manager for this E-Procurement Service. The contractor shall register for the Statewide E-Procurement Service within two (2) business days of notification of award in order to receive an electronic purchase order resulting from award of this contract.

THE SUCCESSFUL BIDDER(S) SHALL PAY A TRANSACTION FEE OF 1.75% (.0175) ON THE TOTAL DOLLAR AMOUNT (EXCLUDING SALES TAXES) OF EACH PURCHASE ORDER ISSUED THROUGH THE STATEWIDE E-PROCUREMENT SERVICE This applies to all purchase orders, regardless of the quantity or dollar amount of the purchase order. The transaction fee shall not be stated or included as a separate item on the invoice. There are no additional fees or charges to the contractor for the services rendered by the Supplier Manager under this contract. Contractor will receive a credit for transaction fees they paid for the purchase of any item(s) if an item(s) is returned through no fault of the contractor. Transaction fees are non-refundable when an item is rejected and returned, or declined, due to the contractor's failure to perform or comply with specifications or requirements of the contract.

Contractor or its Authorized Reseller, as applicable, will be invoiced monthly for the State's transaction fee by the Supplier Manager. The transaction fee shall be based on purchase orders issued for the prior month. Unless Supplier Manager receives written notice from the Contractor identifying with specificity any errors in an invoice within thirty (30) days of the receipt of invoice, such invoice shall be deemed to be correct and Contractor shall have waived its right to later dispute the accuracy and completeness of the invoice. Payment of the transaction fee by the Contractor is due to the account designated by the State within thirty (30) days after receipt of the correct invoice for the transaction fee, which includes payment of all portions of an invoice not in dispute. Within thirty (30) days of the receipt of invoice, contractor may request in writing an extension of the invoice payment due date for that portion of the

transaction fee invoice for which payment of the related goods by the governmental purchasing entity has not been received by the Contractor. If payment of the transaction fee is not received by the State within this payment period, it shall be considered a material breach of contract. The Supplier Manager shall provide, whenever reasonably requested by the contractor in writing (including electronic documents), supporting documentation from the E-Procurement Service that accounts for the amount of the invoice.

The Supplier Manager will capture the order from the State approved user, including the shipping and payment information, and submit the order in accordance with the E-Procurement Service. Subsequently, the Supplier Manager will send those orders to the appropriate contractor on State Contract. The State or State approved user, not the Supplier Manager, shall be responsible for the solicitation, bids received, evaluation of bids received, award of contract, and the payment for goods delivered.

Contractor agrees at all times to maintain the confidentiality of its user name and password for the Statewide E-Procurement Services. If a contractor is a corporation, partnership or other legal entity, then the contractor may authorize its employees to use its password. Contractor shall be responsible for all activity and all charges by such employees. Contractor agrees not to permit a third party to use the Statewide E-Procurement Services through its account. If there is a breach of security through the contractor's account, contractor shall immediately change its password and notify the Supplier Manager of the security breach by e-mail. Contractor shall cooperate with the State and the Supplier Manager to mitigate and correct any security breach.

20. **ELECTRONIC PROCUREMENT (APPLIES ONLY TO STATEWIDE TERM CONTRACTS):** Within ten (10) calendar days of notice, the contractor shall provide supplier information, contract pricing and other product-related information requested by the State or the Supplier Manager. This information shall include such information as contractor name, SKU, brand/manufacturer, product name and a brief description, unit of measure, price, and other similar information properly requested by the State or the Supplier Manager to facilitate purchasing from the contract. This information shall be posted by the contractor in the format provided by the Supplier Manager, or as otherwise provided in a template or format required by the State. No costs or expenses associated with providing this information shall be charged to the State, its agents (including Supplier Manager) or State approved users of the contract. For the purposes of this contract, the contractor warrants that it is authorized and empowered to and hereby grants the State and the Supplier Manager the right and license to use, reproduce, transmit, distribute and publicly display this information. In addition, for the purposes of this contract, the contractor warrants that it is authorized and empowered to and hereby grants the State and the Supplier Manager the right and license to reproduce and display contractor's trademarks, service marks, logos, trade dress or other branding designation that identifies the goods available under the contract. The Supplier Manager shall create and maintain, with contractor's timely assistance, web-based placement of contract information, where appropriate, that includes the contract items distributed by the contractor within the appropriate contract categories. The State shall provide any price adjustment/product modification information that it has approved during the course of the contract, to the Supplier Manager immediately upon such change.

    If the contractor is not the manufacturer, then it shall be the contractor's responsibility to obtain authorization from the manufacturer to comply with the provisions of this contract, including any appropriate intellectual property rights of the manufacturer. If the contractor is the manufacturer, then the manufacturer shall only authorize dealers, outlets, distributors, value added resellers, etc. (together, "Authorized Resellers") within their network that can comply with the provisions of this contract.

    CONTRACTOR IS AND SHALL REMAIN RESPONSIBLE FOR PAYING THE TRANSACTION FEE ON BEHALF OF ITS AUTHORIZED RESELLERS IN THE EVENT THAT THE AUTHORIZED RESELLER(S) DEFAULTS.

21. **CANCELLATION (TERM CONTRACTS ONLY):** All contract obligations shall prevail for at least 90 days after the effective date of the contract. After that period, in addition to the provisions of the paragraph entitled Price Adjustments, for the protection of both parties, this contract may be canceled in whole or in part by either party by giving 30 days prior notice in writing to the other party.

22. **QUANTITIES (TERM CONTRACTS ONLY):** The award of a term contract neither implies nor guarantees any minimum or maximum purchases thereunder.

23. **PRICE ADJUSTMENTS (TERM CONTRACTS ONLY):** Any price changes, downward or upward, which might be permitted during the contract period must be general, either by reason of market change or on the part of the contractor to other customers.
a. **Notification:** Must be given to Union County Public Schools , in writing, concerning any proposed price adjustments. Such notification shall be accompanied by copy of manufacturer's official notice or other acceptable evidence that the change is general in nature.
b. **Decreases:** Union County Public Schools shall receive full proportionate benefit immediately at any time during the contract period.
c. **Increases:** All prices shall be firm against any increase for 180 days from the effective date of the contract. After this period, a request for increase may be submitted with Union County Public Schools reserving the right to accept or reject the increase, or cancel the contract. Such action by Union County Public Schools shall occur not later than 15 days after the receipt by Union County Public Schools of a properly documented request for price increase. Any increases accepted shall become effective not later than 30 days after the expiration of the original 15 days reserved to evaluate the request for increase.
d. **Invoices:** It is understood and agreed that orders will be shipped at the established contract prices in effect on dates orders are placed. Invoicing at variance with this provision will subject the contract to cancellation. Applicable North Carolina sales tax shall be invoiced as a separate item.

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SYSTEM POINT LIST

Analog

SYSTEM POINT DESCRIPTION (BLRPTS) – Boiler and Miscellaneous Points	GRAPHIC	INPUT: TEMPERATURE	INPUT: PRESSURE	INPUT: RH	INPUT: KW	INPUT: GPM	INPUT: CFM	INPUT: PPM	INPUT: PERCENT	INPUT: PERCENT RLA	INPUT: TONS	OUTPUT: DDC	OUTPUT:	OUTPUT: SETPOINT ADJ.	OUTPUT:	OUTPUT:
HOT WATER SUPPLY	X	X														
HOT WATER RETURN	X	X														
FLAME STATUS	X															
GENERAL ALARM	X															
BOILER ENABLE																
PUMP STATUS	X															
PUMP FAIL	X															
PUMP ENABLE																
HW RESET VALVE	X											X		X		
FIRE ALARM STATUS																
MAIN TOILET FANS																
SECONDARY PUMPS	X	X	X									X		X		
OUTDOOR AIR	X	X		X												

Binary

SYSTEM POINT DESCRIPTION	INPUT: PNEU. TRANSDUCER	INPUT: STATUS ON / OFF	INPUT: FILTER STATUS	INPUT: STATUS OPEN / CLSD	INPUT: STATUS	INPUT:	OUTPUT: OFF / ON	OUTPUT: OPEN / CLOSED	OUTPUT: LOCKOUT	OUTPUT: ENABLE / DISABLE	OUTPUT: HIGH / LOW	OUTPUT: AUTO/STOP
HOT WATER SUPPLY												
HOT WATER RETURN												
FLAME STATUS		X										
GENERAL ALARM		X										
BOILER ENABLE										X		
PUMP STATUS		X										
PUMP FAIL		X										
PUMP ENABLE										X		
HW RESET VALVE												
FIRE ALARM STATUS		X										
MAIN TOILET FANS							X					
SECONDARY PUMPS					X		X					
OUTDOOR AIR												

System Features – Alarms

SYSTEM POINT DESCRIPTION	HIGH ANALOG	LOW ANALOG	BINARY	PROOF	SENSOR FAIL	FLOW FAIL	COMM. FAIL	DIAGNOSTICS	LATCHING	LIMIT WARNING
HOT WATER SUPPLY	X	X			X					
HOT WATER RETURN	X	X			X					
FLAME STATUS										
GENERAL ALARM										
BOILER ENABLE										
PUMP STATUS										
PUMP FAIL				X						
PUMP ENABLE										
HW RESET VALVE										
FIRE ALARM STATUS			X							
MAIN TOILET FANS										
SECONDARY PUMPS	X	X			X					
OUTDOOR AIR					X					

System Features – Programs

SYSTEM POINT DESCRIPTION	TIME SCHEDULING	OPT. START / STOP	DEMAND LIMITING	RESET	EVENT PROGRAM	DDC	ALARM INSTRUCT	MAINT. WK. ORDER	RUN TIME	EXP. MESSAGE	SET BACK / SET UP	NIGHT PURGE	TENANT BILLING	CHILLER SEQUENCING	TOTALIZING	TIMED OVERRIDE	MODE CONTROL		NOTES:
HOT WATER SUPPLY																			
HOT WATER RETURN																			
FLAME STATUS																			
GENERAL ALARM																			
BOILER ENABLE	X								X										
PUMP STATUS																			
PUMP FAIL							X												
PUMP ENABLE	X								X										can interlock
HW RESET VALVE				X															
FIRE ALARM STATUS					X		X												
MAIN TOILET FANS	X				X														
SECONDARY PUMPS	X				X														
OUTDOOR AIR																			

GENERAL NOTES: Hot Water System Reset Setpoint Control to be Through Three-Way Valve(s) (if applicable)

Event Program to Include Fire Shutdown

Sep-98

SYSTEM POINT LIST

SYSTEM POINT DESCRIPTION

VFDPTS

Variable Frequency Drives

ANALOG

SYSTEM POINT DESCRIPTION	GRAPHIC	INPUT: HERTZ	INPUT: AMPS	INPUT: RPM	INPUT: KW	INPUT: VOLTS	INPUT: CFM	INPUT: PPM	INPUT: PERCENT	INPUT: PERCENT RLA	INPUT: TONS	OUTPUT: DDC	OUTPUT: SETPOINT ADJ.
OUTPUT FREQUENCY	X	X											
MOTOR CURRENT	X		X										
OUTPUT POWER	X				X								
OUTPUT VOLTAGE	X					X							
LINE VOLTAGE	X					X							
OUTPUT SPEED	X			X									
FREQUENCY SETPOINT	X												X
MOTOR STATUS	X												
GENERAL FAULT	X												
START / STOP													

BINARY

SYSTEM POINT DESCRIPTION	INPUT: PNEU. TRANSDUCER	INPUT: STATUS ON / OFF	INPUT: FILTER STATUS	INPUT: STATUS OPEN / CLSD	INPUT: STATUS	OUTPUT: OFF / ON	OUTPUT: OPEN / CLOSED	OUTPUT: LOCKOUT	OUTPUT: ENABLE / DISABLE	OUTPUT: HIGH / LOW	OUTPUT: AUTO/STOP
OUTPUT FREQUENCY											
MOTOR CURRENT											
OUTPUT POWER											
OUTPUT VOLTAGE											
LINE VOLTAGE											
OUTPUT SPEED											
FREQUENCY SETPOINT											
MOTOR STATUS					X						
GENERAL FAULT											
START / STOP						X					

SYSTEM FEATURES

SYSTEM POINT DESCRIPTION	ALARMS: HIGH ANALOG	ALARMS: LOW ANALOG	ALARMS: BINARY	ALARMS: PROOF	ALARMS: SENSOR FAIL	ALARMS: FLOW FAIL	ALARMS: COMM. FAIL	ALARMS: DIAGNOSTICS	ALARMS: LATCHING	ALARMS: LIMIT WARNING	PROGRAMS: TIME SCHEDULING	PROGRAMS: OPT. START / STOP	PROGRAMS: DEMAND LIMITING	PROGRAMS: RESET	PROGRAMS: EVENT PROGRAM	PROGRAMS: DDC	PROGRAMS: ALARM INSTRUCT	PROGRAMS: MAINT. WK. ORDER	PROGRAMS: RUN TIME	PROGRAMS: EXP. MESSAGE	PROGRAMS: SET BACK / SET UP	PROGRAMS: NIGHT PURGE	PROGRAMS: TENANT BILLING	PROGRAMS: CHILLER SEQUENCING	PROGRAMS: TOTALIZING	PROGRAMS: TIMED OVERRIDE	PROGRAMS: MODE CONTROL	NOTES:
OUTPUT FREQUENCY																												
MOTOR CURRENT																												
OUTPUT POWER																												
OUTPUT VOLTAGE																												
LINE VOLTAGE																												
OUTPUT SPEED																												
FREQUENCY SETPOINT																												
MOTOR STATUS																												
GENERAL FAULT			X														X			X								
START / STOP																												

GENERAL NOTES:

1. Start / Stop and 4-20 mA Setpoint Signal to be Wired to Respective DDC Controller

Sep-98

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Fan Coil Unit Point Schedule

		Outputs								Inputs												Software															
		Digital				Analog				Digital							Analog								Alarm				DDC						Energy Mgmt.						
	System Graphic Display	Start/Stop	Enable/Disable	Open/Close		Setpoint Adjustment	Modulate Open / Close	DDC Control		Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch		Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment	Status/Interlock	High/Low limit			Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification		Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer	
Fan Coil Unit Point Schedule	x	x								x																												
Space Temperature	x																x							x														
Supply Air Temperature	x																		x																		
Dual Temperature Valve	x						x																															

Air Handler Unit Point Schedule

		Outputs								Inputs															Software															
		Digital				Analog				Digital							Analog								Alarm				DDC					Energy Mgmt.						
	System Graphic Display	Start/Stop	Enable/Disable	Open/Close		Setpoint Adjustment	Modulate Open / Close	DDC Control		Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch		Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment	Status/Interlock	High/Low limit			Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification	Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer	
Fan	x	x								x																														
Space Temperature	x																x							x																
Supply Temperature	x																		x																					
Mixed Air Temperature	x																		x																					
Return Air Temperature	x																		x																					
Dual Temperature Valve	x						x																																	
Outside Air Damper	x					x	x																	x																
Smoke Detector	x											x																												

Graphical Global Setting Screen																																							
		Outputs							Inputs														Software														
		Digital				Analog				Digital							Analog								Alarm				DDC					Energy Mgmt.						
	System Graphic Display	Start/Stop	Enable/Disable	Open/Close		Setpoint Adjustment	Modulate Open / Close	DDC Control		Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch		Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment	Status/Interlock	High/Low limit			Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification	Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer	
Maximum Space Setpoint	x																																						
Minimum Space Setpoint	x																																						
NHL/NLL Setpoints	x																																						
Global Setpoints Enable	x																																						
Occupied/Unoccupied	x																																						
Equipment Overrides	x																																						
# of Units to Start Plant						x																																	

Note: This screen allows owner to control minimum and maximum setpoints.

Mechanical Room Point Schedule

		Outputs									Inputs													Software																	
		Digital				Analog					Digital						Analog									Alarm				DDC					Energy Mgmt.							
	System Graphic Display	Start/Stop	Enable/Disable	Open/Close		Setpoint Adjustment	Modulate Open / Close	DDC Control			Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch		Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment	Status/Interlock	High/Low limit			Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification		Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer		
Hot Water Supply Temperature	x																				x																				
Hot Water Return Temperature	x																				x																				
CHW Supply Temperature	x																				x																				
CHW Return Temperature	x																				x																				
Boiler	x	x												x																												
Chiller	x	x												x																												
System Valves	x						x																																		
Pumps	x	x									x																														
Outside Air Temperature	x																				x																				
Outside Air Humidity	x																				x																				

Rooftop Unit Point Schedule

		Outputs									Inputs														Software																	
		Digital					Analog				Digital							Analog								Alarm				DDC					Energy Mgmt.							
	System Graphic Display	Start/Stop	Enable/Disable	Open/Close			Setpoint Adjustment	Modulate Open / Close	DDC Control		Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch		Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment	Status/Interlock	High/Low limit			Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification		Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer		
Fan	x	x									x																														
Space Temperature	x																	x							x																
Supply Temperature	x																			x																				
Mixed Air Temperature	x																			x																				
Return Air Temperature	x																			x																				
Cooling/Heating	x		x																																					
Outside Air Damper	x							x																																
Smoke Detector	x												x																												

Graphical Summary Screen

	System Graphic Display	Outputs								Inputs														Software															
		Digital				Analog				Digital								Analog								Alarm				DDC					Energy Mgmt.						
		Start/Stop	Enable/Disable	Open/Close		Setpoint Adjustment	Modulate Open / Close	DDC Control		Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch			Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment	Status/Interlock	High/Low limit			Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification	Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer	
Space Temperatue	x					x																																	
Space Setpoint	x					x																																	
Supply air temperature	x					x																																	
Setpoint Deviation	x					x																																	
Airflow (VAV)	x					x																																	
Occupied/Unoccupied	x					x																																	
Unit Override	x					x																																	
Heating/Cooling(AHU,UV,FCU)	x					x																																	

Note: Summary screens shall be created for all equipment. Screens shall be utilized to check system conditions without visiting each piece of equipment. Each screen shall contain all equipment by area.

Graphical Global Setting Screen

		Outputs							
		Digital				Analog			
	System Graphic Display	Start/Stop	Enable/Disable	Open/Close		Setpoint Adjustment	Modulate Open / Close	DDC Control	
Maximum Space Setpoint	x								
Minimum Space Setpoint	x								
NHL/NLL Setpoints	x								
Global Setpoints Enable	x								
Occupied/Unoccupied	x								
Equipment Overrides	x								
# of Units to Start Plant						x			

	Inputs														
	Digital							Analog							
	Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch		Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment
Maximum Space Setpoint															
Minimum Space Setpoint															
NHL/NLL Setpoints															
Global Setpoints Enable															
Occupied/Unoccupied															
Equipment Overrides															
# of Units to Start Plant															

	Software														
	Alarm			DDC					Energy Mgmt.						
	Status/Interlock	High/Low limit		Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification	Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer	
Maximum Space Setpoint															
Minimum Space Setpoint															
NHL/NLL Setpoints															
Global Setpoints Enable															
Occupied/Unoccupied															
Equipment Overrides															
# of Units to Start Plant															

Note: This screen allows Owner to control minimum and maximum setpoints.

Unit Ventilator Point Schedule

		Outputs									Inputs												Software																	
		Digital				Analog					Digital							Analog								Alarm				DDC					Energy Mgmt.							
	System Graphic Display	Start/Stop	Enable/Disable	Open/Close		Setpoint Adjustment	Modulate Open / Close	DDC Control			Current Sensing Relay	Differential Pressure Switch	Auxiliary Contact	Alarm Contact	Pulse Contact	Mode Switch		Temperature Space	Space Override Pushbuttons	Temperature Duct Probe	Temperature Averaging	Relative Humidity	Pressure	Flow	Setpoint Adjustment	Status/Interlock	High/Low Limit			Proportional	Proportional & Integral	2 Position	Drive Open/Drive Close	Dehumidification	Time Schedule Start/Stop	Optimum Start/Stop	Day/Night Setback	Demand Limit Cycle	Reset Optimization	Economizer	
Fan	x	x									x																													
Space Temperature	x																	x							x															
Supply Air Temperature	x																			x																			
Low Limit	x													x																									
Dual Temperature Valve	x						x																																
Outside Air Damper	x						x																																
Face and Bypass Damper	x						x																																

ATTACHMENT C

Union County Public School
Certification Form

PROJECT: WESTERN UNION DDC CONTROL UPGRADE 1-9738422A

DESCRIPTION	REQUIRED	N/A	COMMENTS
CERTIFICATE OF OCCUPANCY AND COMPLIANCE/INSPECTIONS	X		DATE OF INSPECTION BY UCPS PROJECT MANAGER
CERTIFICATE OF FIRE INSPECTION REPORTS	X		
CERTIFICATE OF FINAL CLEAN UP	X		
CERTIFICATION OF OWNER INSTRUCTION OF EQUIPMENT AND SYSTEMS	X		
CERTIFICATION OF COMPLETION OF PUNCH LIST ITEMS AND COPY OF PUNCH LIST	X		
CERTIFICATION OF NON-USE OF LEAD PAINT PRODUCTS	X		
CERTIFICATION OF NON-USE OF ASBESTOS CONTAINING PRODUCTS	X		
CERTIFICATION THAT REQUIRED TOOLS, SPARE PARTS, ATTIC STOCK, WERE DELIVERED TO OWNER	X		
WARRANTY ON ALL PRODUCTS AND LABOR	X		
OPERATIONS AND MAINTENANCE BOOKS	X		

ADDITIONAL COMMENTS

_____

_____

_____

_____ _____

Signature **Date**

(Acknowledging all requirements have been met)

This form must be attached to invoice before payment will be issued.

ATTACHMENT D

Attachment D

Union County Public Schools/Union County Agency Lease Agreement for Sales Tax Reimbursement

"Pursuant to North Carolina General Statutes, Section 105-164.14, the Owner is eligible for sales and use tax refunds on all materials which become a permanent part of the construction. The Contractor agrees to provide the Owner documentation which meets the requirements of Sales and Use Tax Regulation 42 regarding requests for refund of sales and use taxes. Those requirements are outlined below:

"(g) All refund claims must be substantiated by proper documentary proof and only those taxes actually paid by the claimant during the fiscal year covered by the refund claim may be included in the claim.

Any local sales or use taxes included in the claim must be separately stated in the claim for refund. In cases where more than one county's sales and use tax has been paid, a breakdown must be attached to the claim for refund showing the amount of each county's local tax separately.

To substantiate a refund claim for sales and use taxes paid on purchases of building materials, supplies, fixtures, and equipment by its contractor, the claimant must secure from such contractor certified statements setting forth the cost of the property purchased from each vendor and the amount of state and local sales and/or use taxes paid thereon. Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of state and local sales or use tax paid thereon by the contractor. Similar certified statements by his subcontractors must be obtained by the general contractor and furnished to the claimant (Owner). Any local sales or use taxes included in the contractor's statements must be shown separately from the State sales or use taxes. The contractor's statements must not contain sales or use taxes paid on purchases of tangible personal property purchased by such contractors for use in performing the contract which does not annex, affix to or in some manner become a part of the building or structure being erected, altered or repaired for the governmental entities as defined by G.S. 105-164.14(c). Examples of property on which sales and use tax has been paid by the contractor and which should not be included in the contractor's statement are scaffolding, forms for concrete, fuel for the operation of machinery and equipment, tools, equipment repair parts and equipment rentals, blueprints, etc."

The Contractor shall submit notarized sales tax certificates which meet the requirements detailed above with each request for payment. Payment will not be made until the sales tax certificate(s) have been submitted to the Owner. Owner is the recipient of sales tax refunds and no such funds shall be provided to Contractor, or claim made by Contractor therefore."

UCPS
UNION COUNTY PUBLIC SCHOOLS
Growing Possibilities...

UNION COUNTY PUBLIC SCHOOLS

PROJECT: WESTERN UNION -DDC CONTROL UPGRADE
REFERENCE NUMBER: 1-9738422A
BID OPENING: 2:00 PM ON WEDNESDAY, OCTOBER 13, 2010

	COMPANY	BASE BID	TOTAL DAYS	COMMENTS
1	SCHNEIDER ELECTRIC	$129,900.00	120	ADDITIONAL 2% DISCOUNT IF MONTHLY PROGRESS BILLINGS ARE ACCEPTED
2	HOFFMAN & HOFFMAN	NO BID	NO BID	NO BID
3	TRANE	NO BID	NO BID	NO BID
4				
5				
6				
7				
8				
9				
10				