Anchor Bay School District
Lottie Schmidt Elementary School

33700 Hooker Rd.,
New Baltimore, MI 48047

Centrix Energy
792 Lois Dr.
Sun Prairie, WI 53590

Centrix Energy
792 Lois Dr
Sun Prairie, WI 53590
(817) 506 8303

No.	Description

ANCHOR BAY SCHOOL DISTRICT

DDC CONTROLS UPGRADES

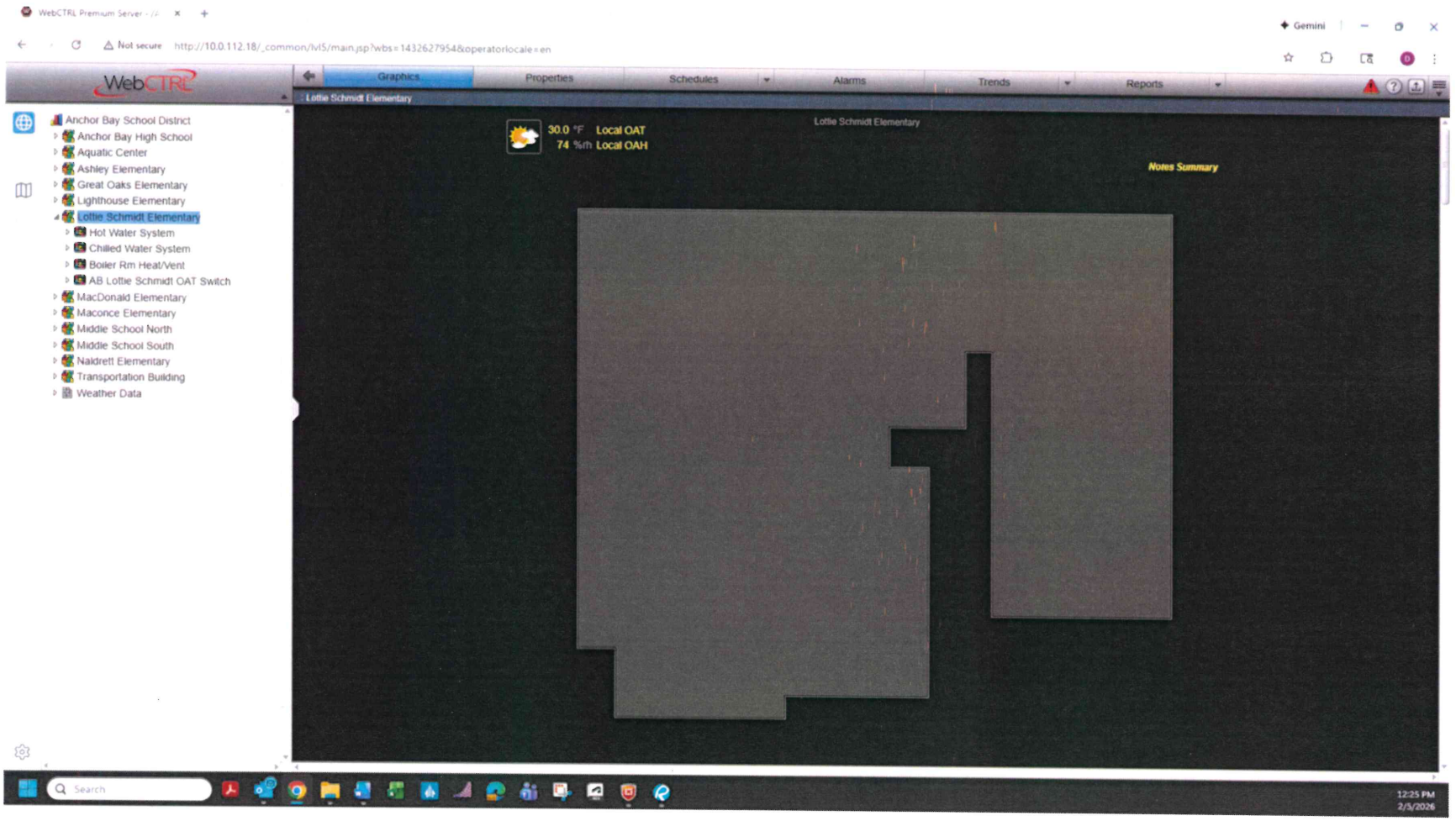
LOTTIE SCHMIDT ELEMENTARY SCHOOL

REQUEST FOR PROPOSAL

MECHANICAL COVER SHEET

REQUEST FOR PROPOSAL
Project Number:
Date: 3/13

M000



EXISTING DDC - ALC

Centr

Centre Energy
790 Lee Dr
Sun Prairie, WI 53590
(817) 908-8993

No.	Description

ANCHOR BAY SCHOOL DISTRICT

DDC CONTROLS UPGRADES

LOTTIE SCHMIDT ELEMENTARY SCHOOL

REQUEST FOR PROPOSAL

EXISTING DDC - ALC

REQUEST FOR PROPOSAL
Project Number:
Date: 3/1

M001

Lottie Elementary

Item #	Area Served	Legacy Control's Page Number	Notes
RTU-1	Café, Kitchen, Platform Music	4 of 9	Include (7)zones w/ RH
RTU-2	Media Center, Computer Labe, Storage	7 of 9	Include (5)zones w/ RH
RTU-2MP	Gymnasium	12 of 23	
RTU-3MP	Gymnasium	12 of 23	
RTU-1	Office Area	8 of 23	Include (8) zones w/ RH
Radiant Panels	Various	20 of 23	qty of 7 zones w/ valves
EF-1	B115, B116 Tlt	20 of 23	
EF-2	A120 Kitchen	20 of 23	
EF-3	A115 Storage	20 of 23	
EF-4	C101,C100 Tlt	20 of 23	
EF-5	C115, C116 Tlt	20 of 23	
EF-6	Tlts C-Wing & D-Wing	20 of 23	
EF-7	EF (Various)	9 of 9	qty of 2
Unit Ventilators	Classrooms	21 of 23	qty of 19
Fan Coil Units	Various	21 of 23	qty of 7

Centr
Centrix Energy
792 Lois Dr
Sun Prairie, WI 53590
(817) 506-8303

No. Description

ANCHOR BAY SCHOOL DISTRICT

DDC CONTROLS UPGRADES

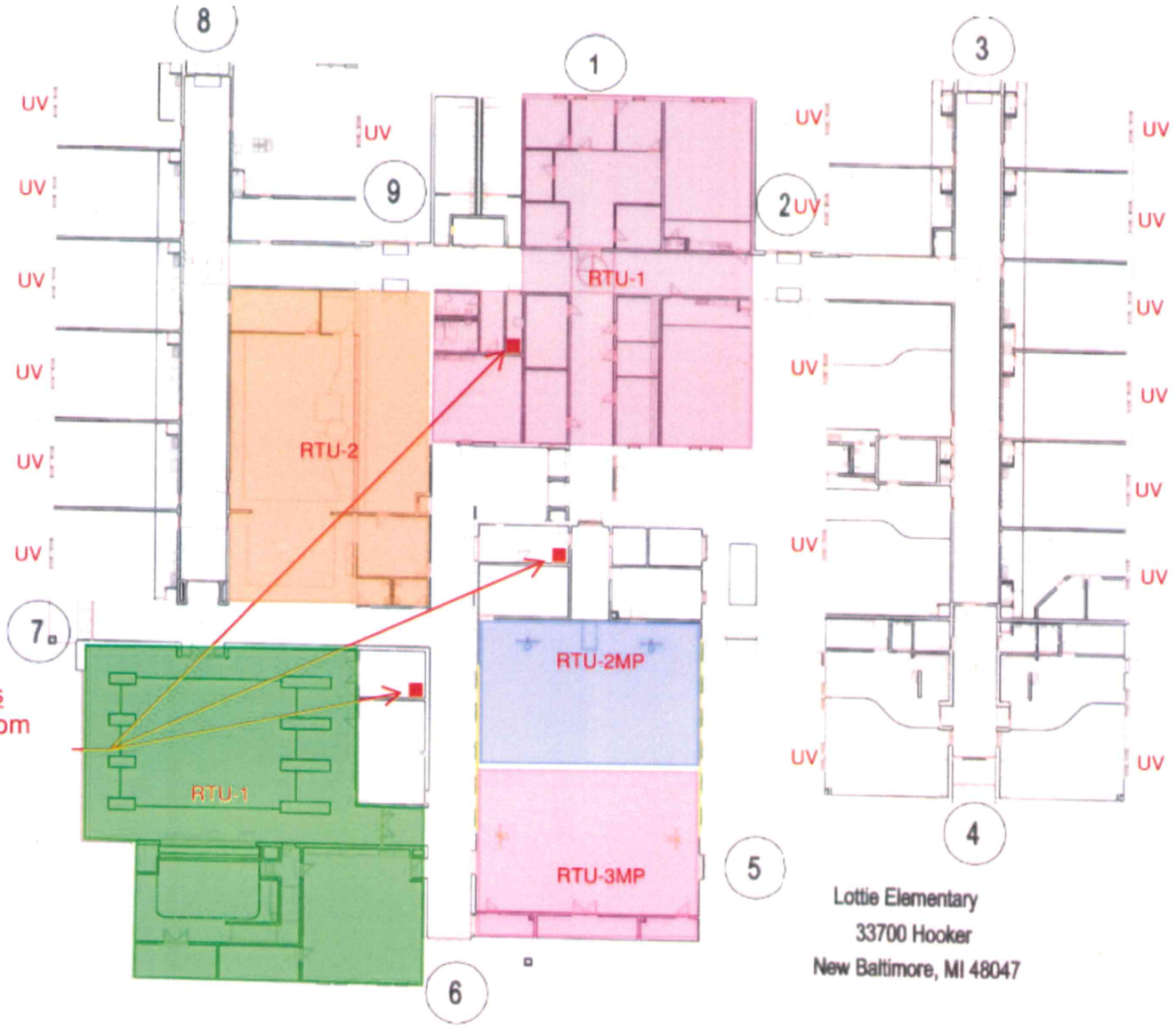
LOTTIE SCHMIDT ELEMENTARY SCHOOL

REQUEST FOR PROPOSAL

EQUIPMENT SCHEDULE FOR DDC UPGRADE

REQUEST FOR PROPOSAL
Project Number:
Date: 3/13

M002



ControlPak Controllers
Qty of 1: Electrical Room
Qty of 1: Storage
Qty of 1: MER

FLOORPLAN FOR DDC UPGRADE

Centr

Centrix Energy
792 Lois Dr
Sun Prairie, WI 53590
(877) 506-8303

No.	Description

ANCHOR BAY SCHOOL DISTRICT

DDC CONTROLS UPGRADES

LOTTIE SCHMIDT ELEMENTARY SCHOOL

REQUEST FOR PROPOSAL

FLOORPLAN FOR DDC UPGRADE

REQUEST FOR PROPOSAL
Project Number:
Date: 3/1

M003

ARCHITECT & PLANNERS : ROY G. FRENCH ASSOCIATES, INC.

CONSULTING ENGINEERS : PETER BASSO ASSOCIATES INC.

CONTRUCTION MANAGEMENT : BARTON MALOW COMPANY

MECHANICAL CONTRACTOR : HEIGHTS HTG. & CLG. INC.

ELECTRICAL CONTRACTOR : ELECTREX INC.

AS BUILT
1-17-95

CTI CONTROLLED TEMPERATURE INC.
1892 BEST DRIVE, WALLED LAKE MICH 48390 TEL (313) 669-9500

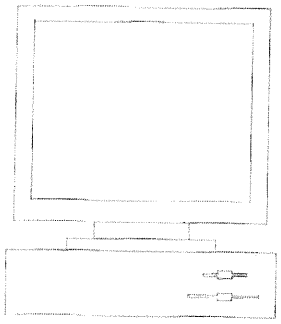
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(COVER SHEET)
NEW BALTIMORE MICHIGAN

DRAWN BY: THIS	CHECKED BY:	DATE: 5-17-94	SHEET 1 OF 20	JOB NO: HVAC 338

SYSTEM ARCHITECTURE

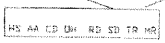
HOST (IBM COMPATIBLE) COMPUTER SYSTEM

ONE COMPUTER SYSTEM TO COMMUNICATE WITH ALL BLDGS.
LOCATED IN MAINTAINANCE OFFICE AT THE TRANSPORTATION COMPLEX.



(HOST COMPUTER / EXISTING)

(PARALLEL PRINTER / EXISTING)



(1200 BUAD MODEM / EXISTING)

PHONE LINE (RJ11)

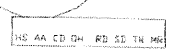
PHONE NUMBER UNLISTED CONTACT SCHOOL DISTRICT.

FIELD PROCESSING UNIT

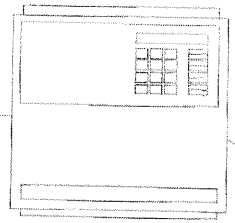
LOCATE IN ELECTRICAL ROOM

PHONE LINE (RJ11)

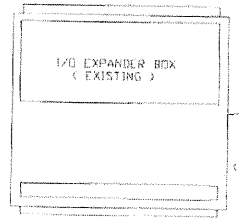
PHONE NUMBER UNLISTED CONTACT SCHOOL DISTRICT.



(1200 BUAD MODEM / EXISTING)
MODEM LOCATED INSIDE EM UNIT



(EM TURBO 48/192 / EXISTING)



RIBBON CABLE (EXISTING)

I/O EXPANDER BOX (LOCATED BELOW EM UNIT)

THIRD PARTY ALARM STATION

ONE STATION TO EXCEPT ALARMS FROM ALL BLDGS.

LOCATED AT THE ALARM ENGINEERING CO

PHONE LINE (RJ11)

TO: ALARM ENGINEERING CO.
MODEM = 1-313-725-0250
BUSINESS = 1-313-725-1661
MR. MIKE PELOVSKI

(SERIAL PRINTER / NEW)

SERIEL PORT PRINTER
CITIZEN GSX-220

(1200 BUAD MODEM / NEW)

EXTERNAL MODEM
ZOOM 9648

AS BUILT
3-17-95

NEW PAGE

CONTROLLED TEMPERATURE INC.
1697 WEST DRIVE, WALLED LAKE MICH 48390 TEL (313) 669-6000

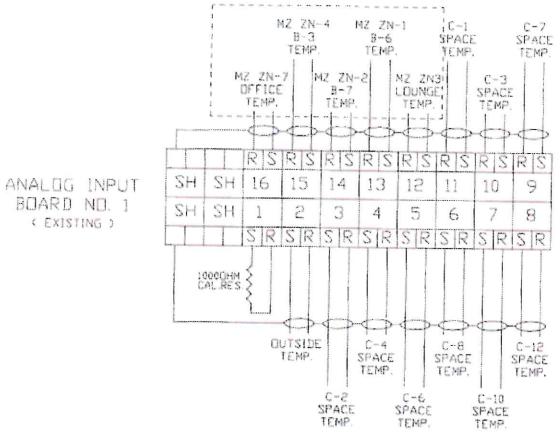
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(SYSTEM ARCHITECTURE)
NEW BALTIMORE, MICHIGAN

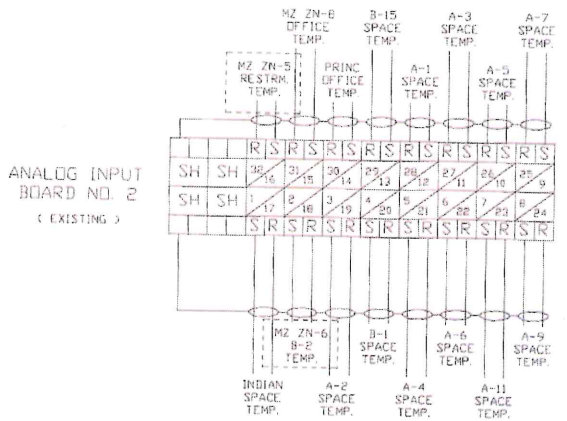
DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO
THS		5-17-94	SHEET 2 OF 20	HVAC-332

NEW PAGE

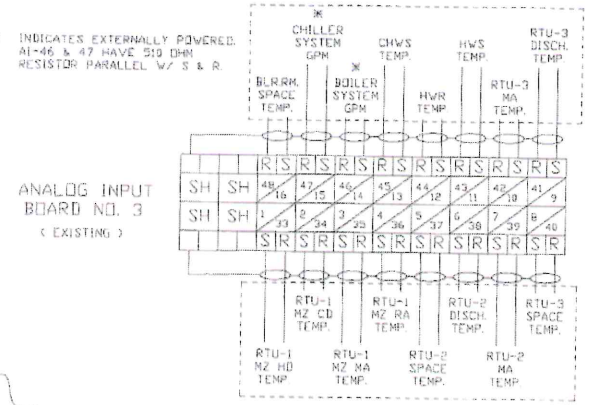
EM TURBO 48/192 TERMINAL CONNECTIONS

LAN ADDRESS 01
LOC ELECTRICAL ROOM

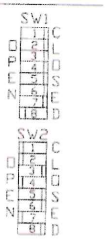


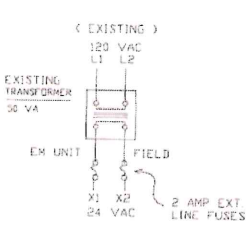


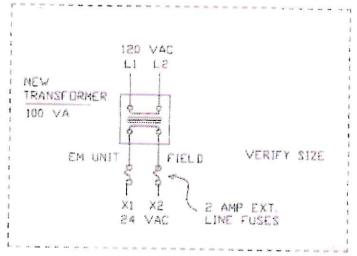
* INDICATES EXTERNALLY POWERED. AI-46 & 47 HAVE 510 OHM RESISTOR PARALLEL W/ S & R.



(EXISTING)
CPU DIP SW. SETTINGS







AS BUILT 1-17-95

INDICATES NEW POINT OR RE-USED EXISTING POINT. ALL OTHER POINTS ARE EXISTING.

INCLUDE IN BASE BID

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE, WALLED LAKE MICH. 48390 TEL. (313) 669-0900

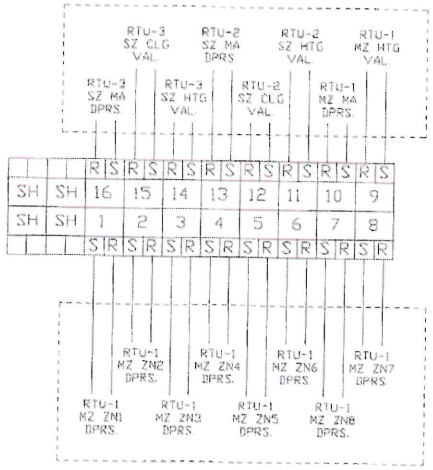
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(EM TURBO-48/192 TERMINAL CONNECTIONS LAN-01)
NEW BALTIMORE, MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
THIS		5-5-94	SHEET 3 OF 20	HVAC-332

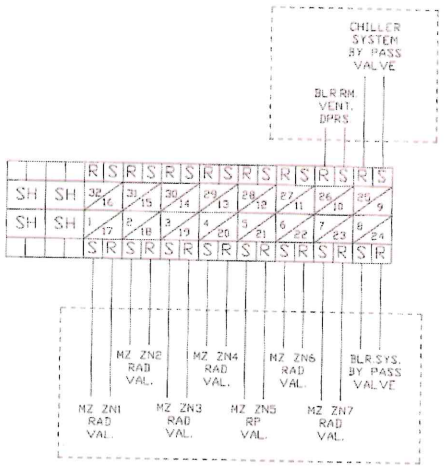
EM TURBO 48/192 TERMINAL CONNECTIONS

LAN ADDRESS 01
LOC: ELECTRICAL ROOM

ANALOG OUTPUT BOARD NO. 1
(EXISTING)



ANALOG OUTPUT BOARD NO. 2
(EXISTING)



INDICATES NEW POINT OR RE-USED POINT

NEW PAGE

AS BUILT
1-17-95

INCLUDE IN BASE BID

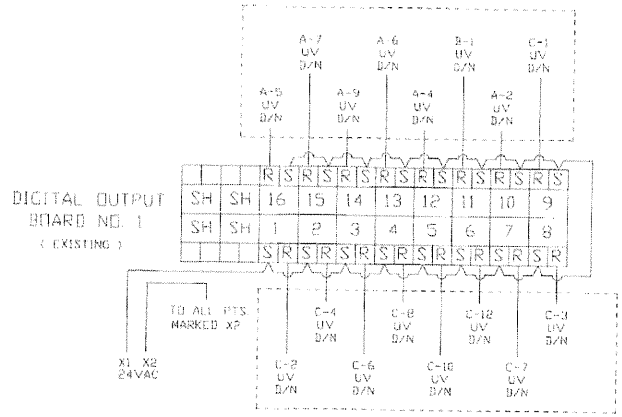
CTI CONTROLLED TEMPERATURE INC.
1697 BEST DRIVE , WALLED LAKE MICH. 48390 TEL (810) 669-9508

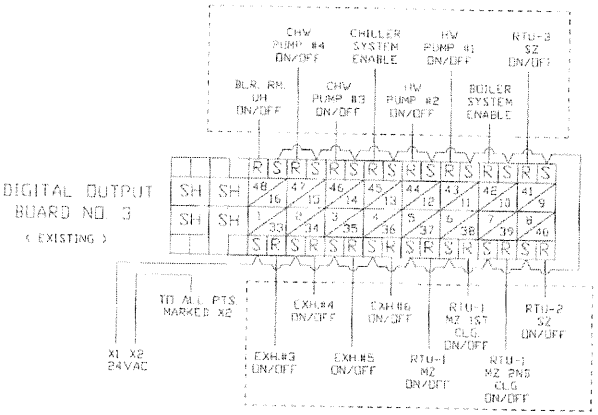
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(EM TURBO-48/192 TERMINAL CONNECTIONS LAN-01)
NEW BALTIMORE MICHIGAN

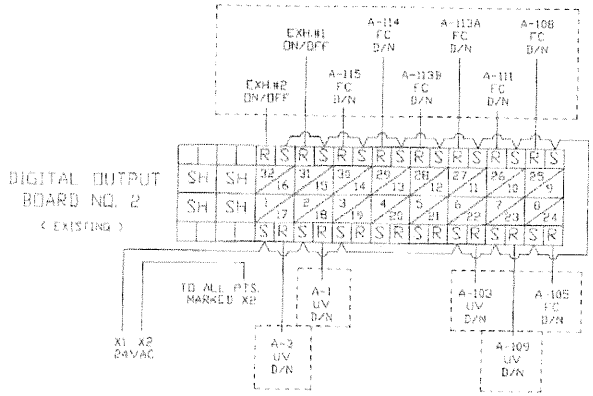
DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
TMIS		5-5-94	SHEET 4 OF 20	HVAC-332

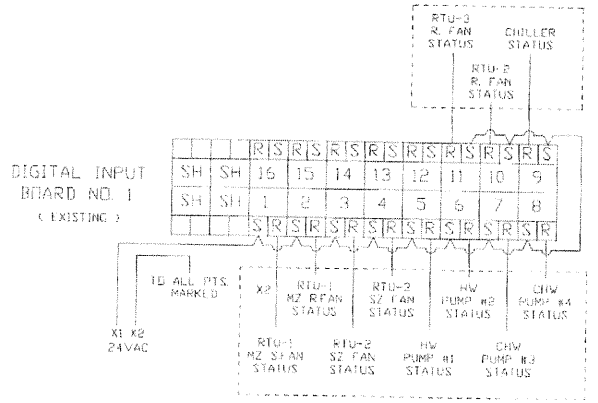
FM TURBO 48/192 TERMINAL CONNECTIONS

(LAN ADDRESS 01
IDC ELECTRICAL ROOM









NEW PAGE

INDICATES NEW POINT OR RE-USED POINT.

AS BUILT
3-17-95

CONTROLLED TEMPERATURE INC.
3097 BEST DRIVE, WALLED LAKE MICH. 48390 TEL. (313) 669-6200

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(FM TURBO-48/192 TERMINAL CONNECTIONS LAN-01)
NEW BALTIMORE, MICHIGAN

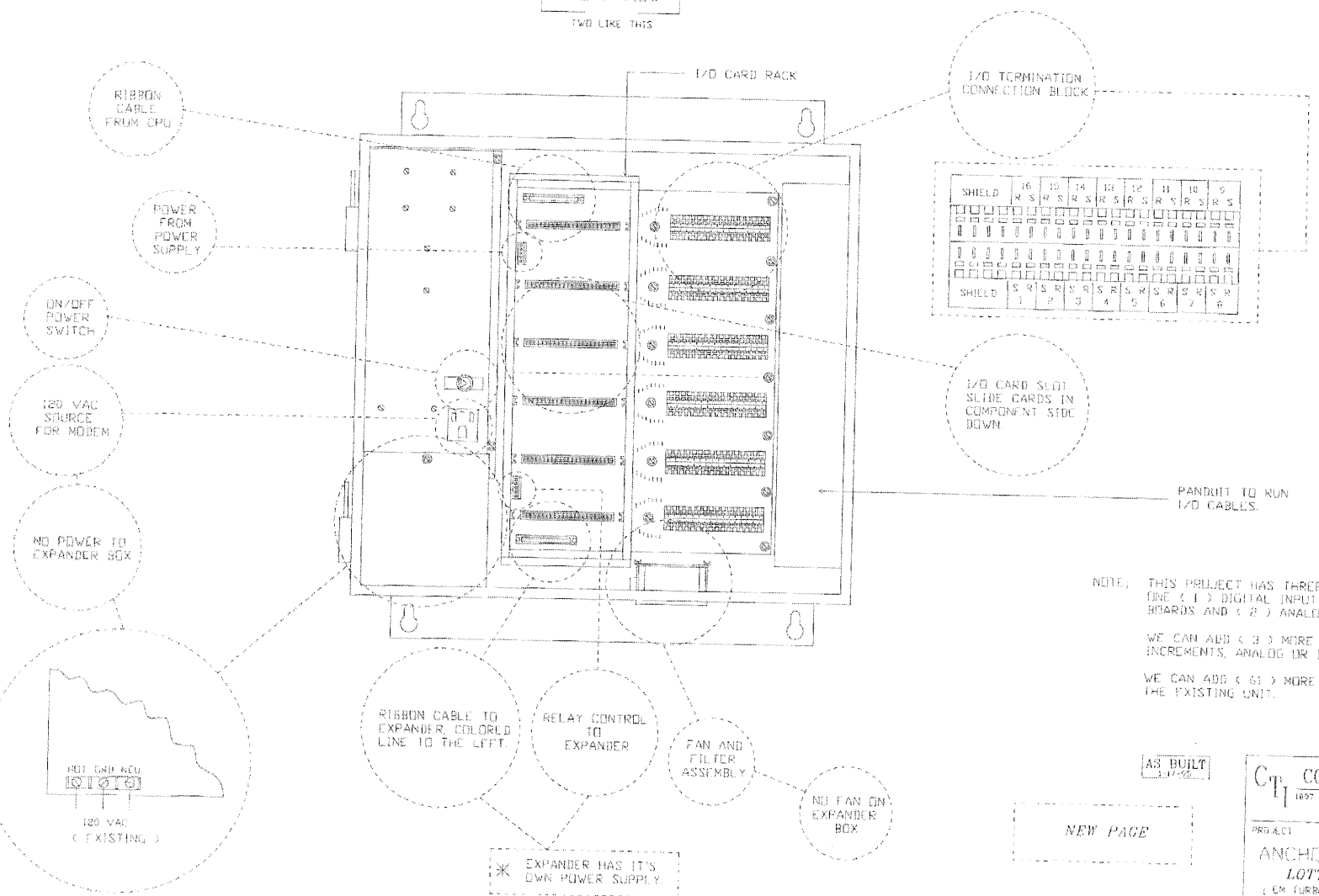
DRAWN BY: THIS	CHECKED BY:	DATE: 5-5-94	SHEET 5 OF 20	JOB NO: HVAC-332

EM 48/192 WALL UNIT & EXPANDER BOX LAYOUT

LOCATED IN ELECTRICAL ROOM

FRONT VIEW

TWO LIKE THIS



NOTE: THIS PROJECT HAS THREE (3) ANALOG INPUT BOARDS, ONE (1) DIGITAL INPUT BOARD, (3) DIGITAL OUTPUT BOARDS AND (2) ANALOG OUTPUT BOARDS.

WE CAN ADD (3) MORE I/O BOARDS IN (16) POINT INCREMENTS, ANALOG OR DIGITAL.

WE CAN ADD (61) MORE UNITS AND NETWORK THEM TO THE EXISTING UNIT.

AS BUILT 5-17-94

NEW PAGE

CTI CONTROLLED TEMPERATURE INC.

1697 BEST DRIVE, WALLED LAKE MICH. 48390 TEL (313) 669-0599

PROJECT

ANCHOR BAY SCHOOL DISTRICT

LOTTIE M SCHMIDT ELEMENTARY

(EM TURBO-48/192 I/O CARD AND MOTHERBOARD LAYOUT)

NEW BALTIMORE MICHIGAN

DRAWN BY	CHECKED BY	DATE	SHEET	JOB NO
THIS		5-17-94	SHEET 6 OF 20	HVAL-332

SEQUENCE OF OPERATION FOR ROOF TOP UNIT #1 AND #2

ROOF TOP UNIT #1 MULTIZONE

WITH THE SUPPLY FAN MOTOR STARTER HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION, THE RTU SUPPLY FAN WILL BE AUTOMATICALLY STARTED AND STOPPED THROUGH THE CONTROL PAK DDC SYSTEM AT THE OCCUPANCY HOUR BASED ON THE PRE-PROGRAMMED OCCUPANCY SCHEDULE.

WITH THE RETURN FAN MOTOR STARTER HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION, THE RETURN FAN WILL BE ELECTRICALLY INTERLOCKED WITH THE SUPPLY FAN AND WILL START WHENEVER THE SUPPLY FAN STARTS.

WHENEVER THE SUPPLY FAN IS STARTED THE OUTSIDE AIR DAMPERS WILL OPEN TO MINIMUM POSITION AS PROGRAMMAED THROUGH THE CONTROL PAK DDC SYSTEM.

PROOF OF FLOW STATUS FOR THE SUPPLY FAN AND RETURN FAN WILL BE PROVEN TO THE CONTROL PAK DDC SYSTEM BY MEANS OF THE SUPPLY AND RETURN FANS RESPECTIVE MOTOR CURRENT SWITCH.

THE OPTIMUM START PROGRAM WILL DETERMINE THE OPTIMUM START TIME REQUIRED TO ATTAIN DESIRED SPACE TEMP. AT OCCUPANCY TIME, WHEN OUTSIDE AIR TEMP. IS ABOVE 50 DEGREES F. THE OPTIMUM START TIME WILL BE EQUAL TO THE OCCUPANCY TIME.

WHEN THE SYSTEM IS STARTED BY THE OPTIMUM START PROGRAM PRIOR TO THE OCCUPANCY TIME, THE WARM UP CYCLE PROGRAM WILL FULLY CLOSE THE OUTSIDE AND RELIEF AIR DAMPERS AND FULLY OPEN THE RETURN AIR DAMPERS. WHEN THE WARM UP CYCLE IS COMPLETE AND DESIRED SPACE TEMP. IS REACHED, THE OUTSIDE AND RELIEF AIR DAMPERS WILL OPEN TO MINIMUM POSITION OR AS REQUIRED TO MAINTAIN THE DESIRED TEMPERATURE AS PROGRAMMED BY THE CONTROL PAK DDC SYSTEM.

THE HOT TEMP. SENSOR THROUGH THE CONTROL PAK DDC SYSTEM WILL MODULATE THE HOT DECK COIL CONTROL VALVE TO MAINTAIN THE HOT DECK TEMP. SETPOINT. THE HOT DECK TEMP. SETPOINT WILL BE RESET BY THE CONTROL PAK DDC SYSTEM BASED ON THE ZONE SENSOR HAVING THE MOST HEATING DEMAND. THE HOT DECK TEMP. SETPOINT WILL BE THE LOWEST TEMP. WHICH SATISFIES THE ZONE WITH THE HIGHEST HEATING DEMAND. WHEN THE OUTSIDE TEMP. IS ABOVE 70 DEGREE'S F. THE HOT DECK WILL BE LOCKED OUT.

DURING THE UNOCCUPIED MODE THE RTU WILL BE OFF AND THE FINNED TUBE RADIATION VALVE WILL BE MODULATED THROUGH THE CONTROL PAK DDC SYSTEM BASED ON TEMP. FEEDBACK TO MAINTAIN A NIGHT SETBACK TEMP. OF 58 DEGREES F. (WINTER ONLY).

THE COLD DECK TEMP. SENSOR THROUGH THE CONTROL PAK DDC SYSTEM WILL MODULATE THE MIXED AIR DAMPERS AND THE COOLING CONTROL CIRCUITS IN SEQUENCE TO MAINTAIN COLD DECK TEMP. SETPOINTS. THE COLD DECK TEMP. SETPOINT WILL BE RESET BY THE CONTROL PAK DDC SYSTEM BASED ON THE ZONE TEMP. SENSOR HAVING THE HIGHEST COOLING DEMAND. THE COLD DECK TEMP. SETPOINT WILL BE THE HIGHEST TEMP. WHICH SATISFIES THE ZONE WITH THE HIGHEST COOLING DEMAND.

THE ECONOMIZER PROGRAM WILL OVERRIDE THE MIXED AIR DAMPER CONTROL SIGNAL TO MOVE THE OUTSIDE AIR DAMPER TO MINIMUM POSITION WHENEVER THE OUTSIDE AIR TEMP. IS ABOVE THE COLD DECK DISCHARGE AIR TEMP.

DURING THE COOLING SEASON, WHEN THE OUTSIDE AIR TEMP. IS BETWEEN 60 DEGREES F. AND 70 DEGREES F. AND THE SPACE TEMP. IS ABOVE 75 DEGREES F. THE MORNING (PRE-OCCUPANCY) PURGE CYCLE WILL BE ACTIVATED TO USE 100% OUTSIDE AIR TO PRE-COOL THE SPACE TO 70 DEGREES F., THE OUTSIDE AND RELIEF AIR DAMPERS WILL BE OPEN AND THE RETURN AIR DAMPERS WILL BE CLOSED DURING THE PURGE CYCLE. THE MECHANICAL COOLING WILL REMAIN DE-ACTIVATED.

WHENEVER THE SUPPLY FAN IS DE-ENERGIZED, THE OUTSIDE AND RELIEF AIR DAMPERS WILL CLOSE AND THE DX COOLING WILL BE DE-ENERGIZED.

THE ZONE TEMP. SENSOR THROUGH THE CONTROL PAK DDC SYSTEM WILL MODULATE IN SEQUENCE THE ZONE FIN TUBE RADIATION VALVE(S) AND THE ZONE DAMPERS TO MAINTAIN AN ADJUSTABLE ZONE TEMP. SETPOINT OF 75 DEGREES F.

SMOKE DETECTORS AND FREEZESTAT WILL BE-ENERGIZE THE SUPPLY FAN WHEN THEIR SETPOINTS ARE REACHED. SMOKE DETECTOR WILL SIGNAL THE FIRE ALARM SYSTEM.

ROOF TOP UNIT #2 & 3 SINGLEZONE

WITH THE SUPPLY FAN MOTOR STARTER HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION, THE RTU SUPPLY FAN WILL BE AUTOMATICALLY STARTED AND STOPPED THROUGH THE CONTROL PAK DDC SYSTEM AT THE OCCUPANCY HOUR BASED ON THE PRE-PROGRAMMED OCCUPANCY SCHEDULE.

WITH THE RETURN FAN MOTOR STARTER HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION, THE RETURN FAN WILL BE ELECTRICALLY INTERLOCKED WITH THE SUPPLY FAN AND WILL START WHENEVER THE SUPPLY FAN STARTS.

WHENEVER THE SUPPLY FAN IS STARTED THE OUTSIDE AIR DAMPERS WILL OPEN TO MINIMUM POSITION OF 20% AS PROGRAMMAED THROUGH THE CONTROL PAK DDC SYSTEM.

PROOF OF FLOW STATUS FOR THE SUP/RET FAN WILL BE PROVEN TO THE CONTROL PAK DDC SYSTEM BY MEANS OF THE SUPPLY FAN MOTOR CURRENT SWITCH.

THE OPTIMUM START PROGRAM WILL DETERMINE THE OPTIMUM START TIME REQUIRED TO ATTAIN DESIRED SPACE TEMP. AT OCCUPANCY TIME, WHEN OUTSIDE AIR TEMP. IS ABOVE 50 DEGREES F. THE OPTIMUM START TIME WILL BE EQUAL TO THE OCCUPANCY TIME.

WHEN THE SYSTEM IS STARTED BY THE OPTIMUM START PROGRAM PRIOR TO THE OCCUPANCY TIME, THE WARM UP CYCLE PROGRAM WILL FULLY CLOSE THE OUTSIDE AND RELIEF AIR DAMPERS AND FULLY OPEN THE RETURN AIR DAMPERS. WHEN THE WARM UP CYCLE IS COMPLETE AND DESIRED SPACE TEMP. IS REACHED, THE OUTSIDE AND RELIEF AIR DAMPERS WILL OPEN TO MINIMUM POSITION OR AS REQUIRED TO MAINTAIN THE DESIRED TEMPERATURE AS PROGRAMMED BY THE CONTROL PAK DDC SYSTEM.

THE CONTROL PAK DDC SYSTEM WILL CONTROL THE HEATING COIL CONTROL VALVE, MIXED AIR DAMPERS AND THE CHILLED WATER CONTROL VALVE IN SEQUENCE TO MAINTAIN SUPPLY AIR TEMP. SETPOINT. THE SUPPLY AIR TEMP. SETPOINT WILL BE RESET BASED ON SPACE TEMP. FEEDBACK FROM THE SPACE TEMP. SENSOR AND LIMITED BY THE SUPPLY AIR SENSOR.

DURING THE UNOCCUPIED MODE THE UNIT WILL BE CYCLED WITH THE OUTSIDE AND RELIEF AIR DAMPERS CLOSED BASED ON SPACE TEMP. FEEDBACK TO MAINTAIN A NIGHT SETBACK TEMP. OF 58 DEGREES F. (WINTER ONLY).

WHENEVER THE SUPPLY FAN IS DE-ENERGIZED, THE OUTSIDE AND RELIEF AIR DAMPERS WILL CLOSE.

SMOKE DETECTORS AND FREEZESTAT WILL BE-ENERGIZE THE SUPPLY FAN WHEN THEIR SETPOINTS ARE REACHED. SMOKE DETECTOR WILL SIGNAL THE FIRE ALARM SYSTEM.

NEW PAGE

INCLUDE IN BASE BID

AS BUILT 1-17-95

CTI CONTROLLED TEMPERATURE INC.
1097 BEST DRIVE , WALLED LAKE MICH. 48390 TEL (313) 669-9000

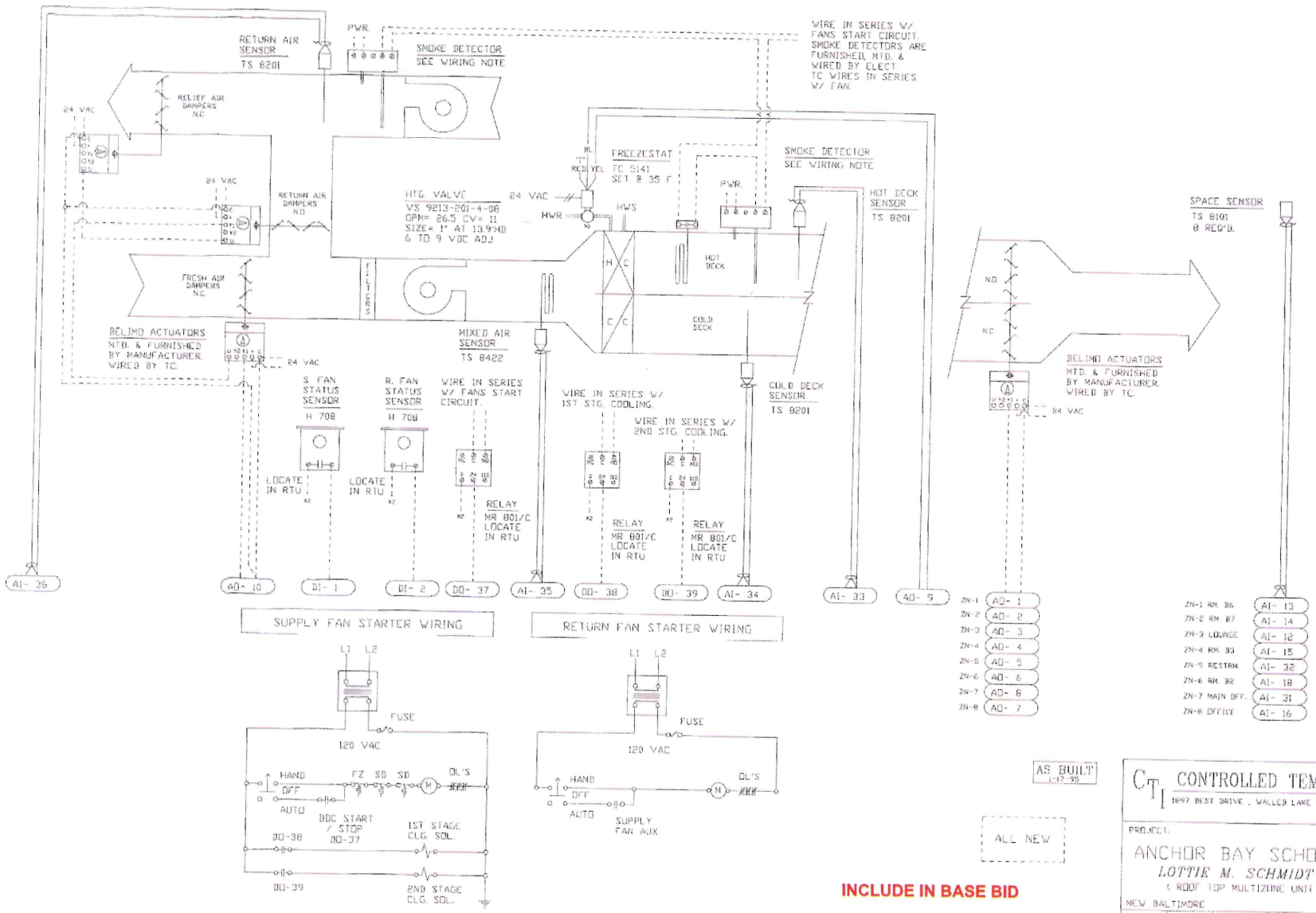
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(SEQUENCE OF OPERATION FOR RTU #1 & #2)

NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE		JOB NO.
THIS		5-18-94	SEQUENCE	HVAC-332

RTU-1 MULTIZONE CONTROL

LAN ADDRESS 01



SUPPLY FAN STARTER WIRING

RETURN FAN STARTER WIRING

AS BUILT 1-07-95

ALL NEW

INCLUDE IN BASE BID

CTI CONTROLLED TEMPERATURE INC.

1697 BEST DRIVE, WALLED LAKE MICH. 48390 TEL (313) 669-0500

PROJECT:

ANCHOR BAY SCHOOL DISTRICT

LOTTIE M. SCHMIDT ELEMENTARY

(ROOF TOP MULTIZONE UNIT CONTROL LAN-01)

NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
T.N.S.		5-5-94	7 OF 20	HVAC-332

CONTROL INTERNATIONAL PAK © 1993

PROGRAMMABLE LOGIC CONTROL OBJECTS

LOOP

DA = DIRECT ACTING
RA = REVERSE ACTING

CONTROLLER

PROPORTIONAL/TWO POSITION
DIRECT OR REVERSE ACTING
FULL PID (PROPORTIONAL-INTERGAL-DERATIVE

FLIP FLOP

OUTPUT IS SET ON WHEN INPUT B GOES ON AND INPUT A IS OFF. OUTPUT IS RESET OFF WHENEVER INPUT A GOES ON. OUTPUT EQUALS ITS PREVIOUS VALUE IF BOTH INPUTS ARE OFF.

FLIP FLOP

OUTPUT IS SET EQUAL TO INPUT B WHEN INPUT A GOES ON. OUTPUT WILL FOLLOW THE VALUE OF INPUT B AS LONG AS INPUT A REMAINS ON. WHEN INPUT A GOES OFF, OUTPUT WILL BE SET EQUAL TO THE LAST VALUE OF INPUT B AND WILL STAY THAT WAY UNTIL INPUT A GOES BACK ON.

AND

OUTPUT GOES ON WHEN INPUT A AND INPUT B ARE BOTH ON , ALL OTHER CASES OUTPUT IS OFF.

NAND

OUTPUT GOES OFF WHEN INPUT A AND INPUT B ARE BOTH ON , ALL OTHER CASES OUTPUT IS ON.

MATH

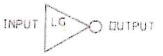
SIGNAL CONDITIONER

HIGH/LOW SELECT
AVERAGING
REVERSE
SPLIT SIGNAL
CALCULATIONS
ETC.

MATH SUB-ROUTINE

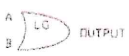
REALLY SAME AS MATH

NOT



OUTPUT IS ON WHEN INPUT IS OFF AND OUTPUT IS OFF WHEN INPUT IS ON.

OR



IF INPUT A OR INPUT B IS ON OUTPUT IS ON. IF INPUT A AND INPUT B ARE OFF OUTPUT IS OFF.

XOR

IF INPUT A AND INPUT B ARE DIFFERENT OUTPUT IS ON. IF INPUTS ARE THE SAME THE OUTPUT IS OFF.

OPTIMIZER

HEATING OR COOLING

LEARNS HEAT LOSS OR HEAT GAIN OF BUILDING OR AREA. CHANGES SETPOINTS EARLIER OR LATER TO BRING BUILDING OR AREA TO SETPOINT BY OCCUPIED TIME.

TIMER

LIKE A TIME DELAY RELAY

DELAY ON
DELAY OFF
MIN ON
MIN OFF
COUNTER
DUTY CYCLE

ZONE

USED LIKE A TIME CLOCK. PASSES HEATING , COOLING , DAY & NITE SETPOINTS AT A PROGRAMED TIME.

TIME CLOCK

PASSES ON AND OFF COMMANDS AT A PROGRAMED TIME

USER FUNCTION

LIKE A MACRO, PREFORMS MULTIPLE STEPS WITH A COUPLE OF KEY STROKES.

NEW PAGE

INCLUDE IN BASE BID

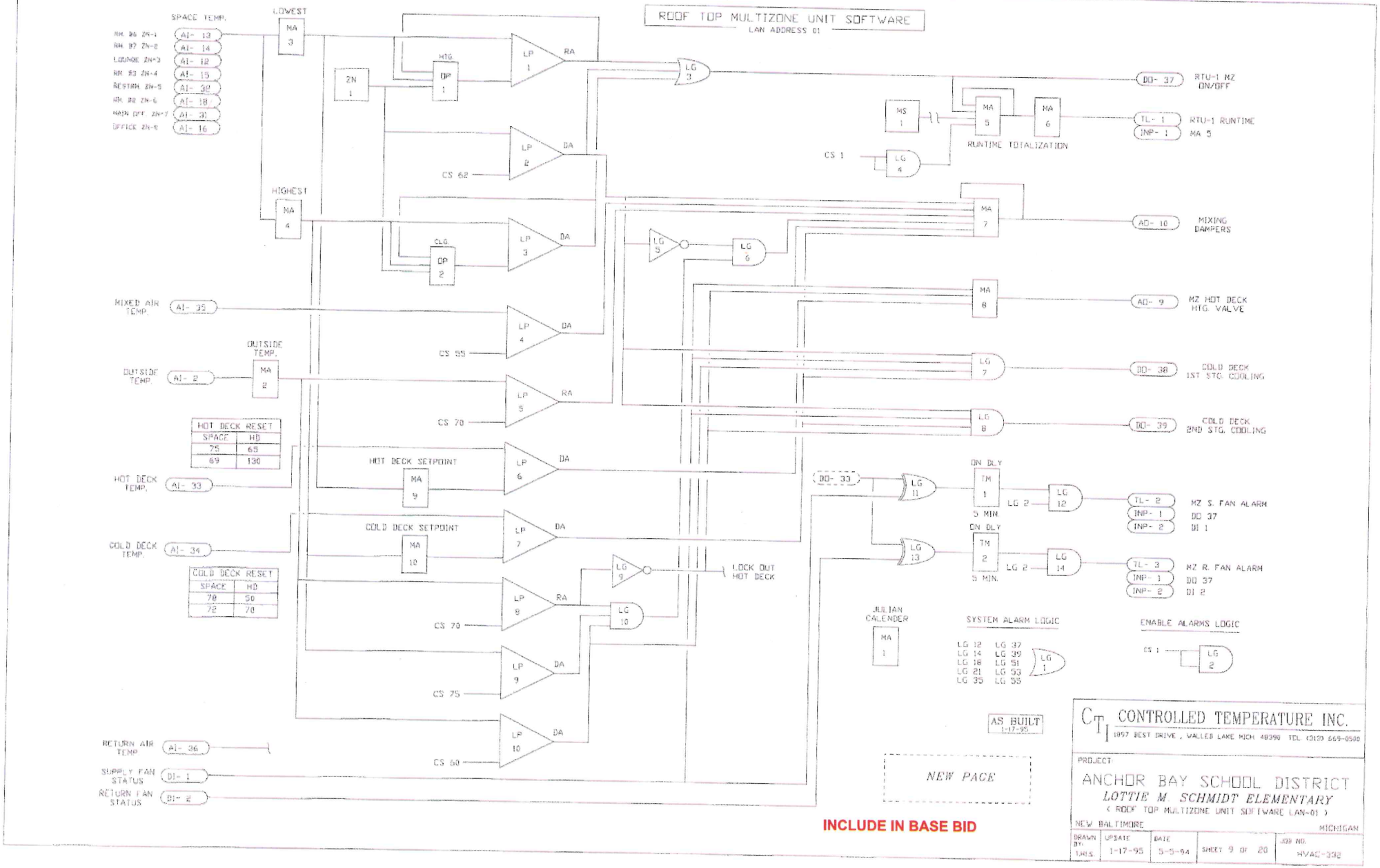
AS BUILT 1-17-95

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE , WALLED LAKE, MICH. 48390 TEL (313) 669-0560

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(PROGRAMMABLE LOGIC CONTROL OBJECTS)

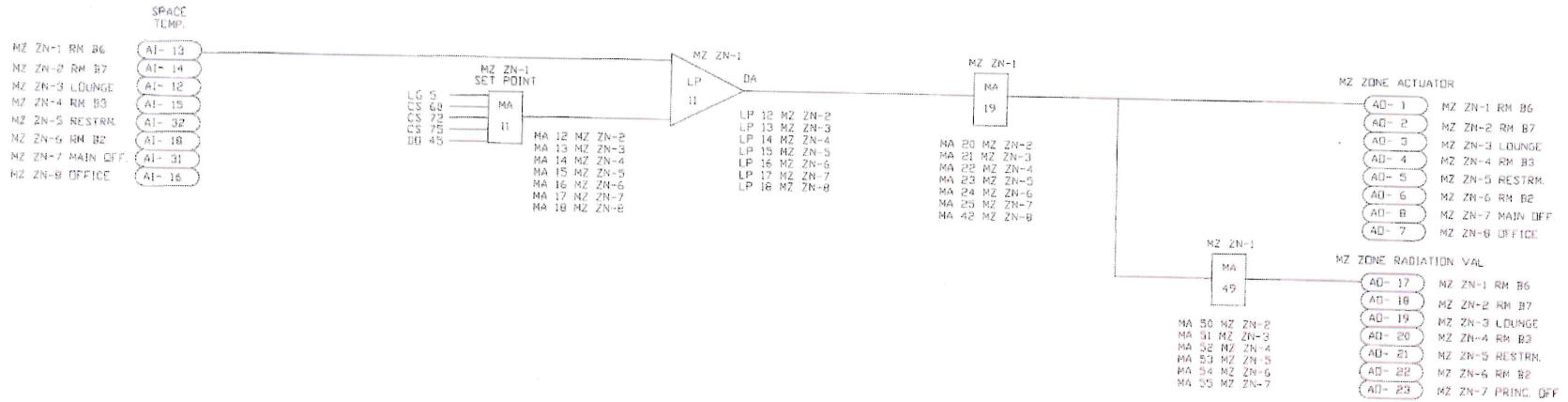
NEW BALTIMORE, MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO
THS		5-17-94	8 OF 20	HVAC-332


ROOF TOP MULTIZONE UNIT SOFTWARE
LAN ADDRESS 01
SPACE TEMP.
RM. 96 ZN-1
RM. 97 ZN-2
LOUNGE ZN-3
RM. 93 ZN-4
RESTRM. ZN-5
RM. 92 ZN-6
MAIN OFF. ZN-7
OFFICE ZN-8
AI- 13
AI- 14
AI- 12
AI- 15
AI- 32
AI- 18
AI- 31
AI- 16
LOWEST
MA 3
HIGHEST
MA 4
ZN 1
HTG.
DP 1
CLG.
DP 2
LP 1
RA
LP 2
DA
LP 3
LP 4
LP 5
LP 6
LP 7
LP 8
LP 9
LP 10
CS 62
CS 55
CS 70
CS 75
CS 60
LG 3
LG 4
LG 5
LG 6
LG 7
LG 8
LG 9
LG 10
LG 11
LG 12
LG 13
LG 14
MS 1
CS 1
MA 5
MA 6
RUNTIME TOTALIZATION
MA 7
MA 8
MIXED AIR TEMP.
AI- 35
OUTSIDE TEMP.
AI- 2
MA 2
HOT DECK RESET
SPACE
HD
75
65
69
130
HOT DECK TEMP.
AI- 33
HOT DECK SETPOINT
MA 9
COLD DECK TEMP.
AI- 34
COLD DECK SETPOINT
MA 10
COLD DECK RESET
SPACE
HD
70
50
72
70
LOCK OUT HOT DECK
RETURN AIR TEMP.
AI- 36
SUPPLY FAN STATUS
DI- 1
RETURN FAN STATUS
DI- 2
DO- 37
RTU-1 MZ ON/OFF
TL- 1
INP- 1
RTU-1 RUNTIME
MA 5
AO- 10
MIXING DAMPERS
AO- 9
MZ HOT DECK HTG. VALVE
DO- 38
COLD DECK 1ST STG. COOLING
DO- 39
COLD DECK 2ND STG. COOLING
DO- 33
ON DLY
TM 1
5 MIN.
LG 2
TL- 2
INP- 1
INP- 2
MZ S. FAN ALARM
DO 37
DI 1
TM 2
TL- 3
MZ R. FAN ALARM
DO 37
DI 2
JULIAN CALENDER
MA 1
SYSTEM ALARM LOGIC
LG 12 LG 37
LG 14 LG 39
LG 16 LG 51
LG 21 LG 53
LG 35 LG 55
LG 1
ENABLE ALARMS LOGIC
CS 1
LG 2
AS BUILT
1-17-95
NEW PAGE
INCLUDE IN BASE BID
CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE, WALLED LAKE MICH. 48390 TEL. (0139) 669-0580
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(ROOF TOP MULTIZONE UNIT SOFTWARE LAN-01)
NEW BALTIMORE
MICHIGAN
DRAWN BY: LHS
UPDATE 1-17-95
DATE 5-5-94
SHEET 9 OF 20
JOB NO. HVAC-332

RTU #1 MULTIZONE UNIT ZONE CONTROL

LAN ADDRESS 01



NEW PAGE

AS BUILT
1-17-95

INCLUDE IN BASE BID

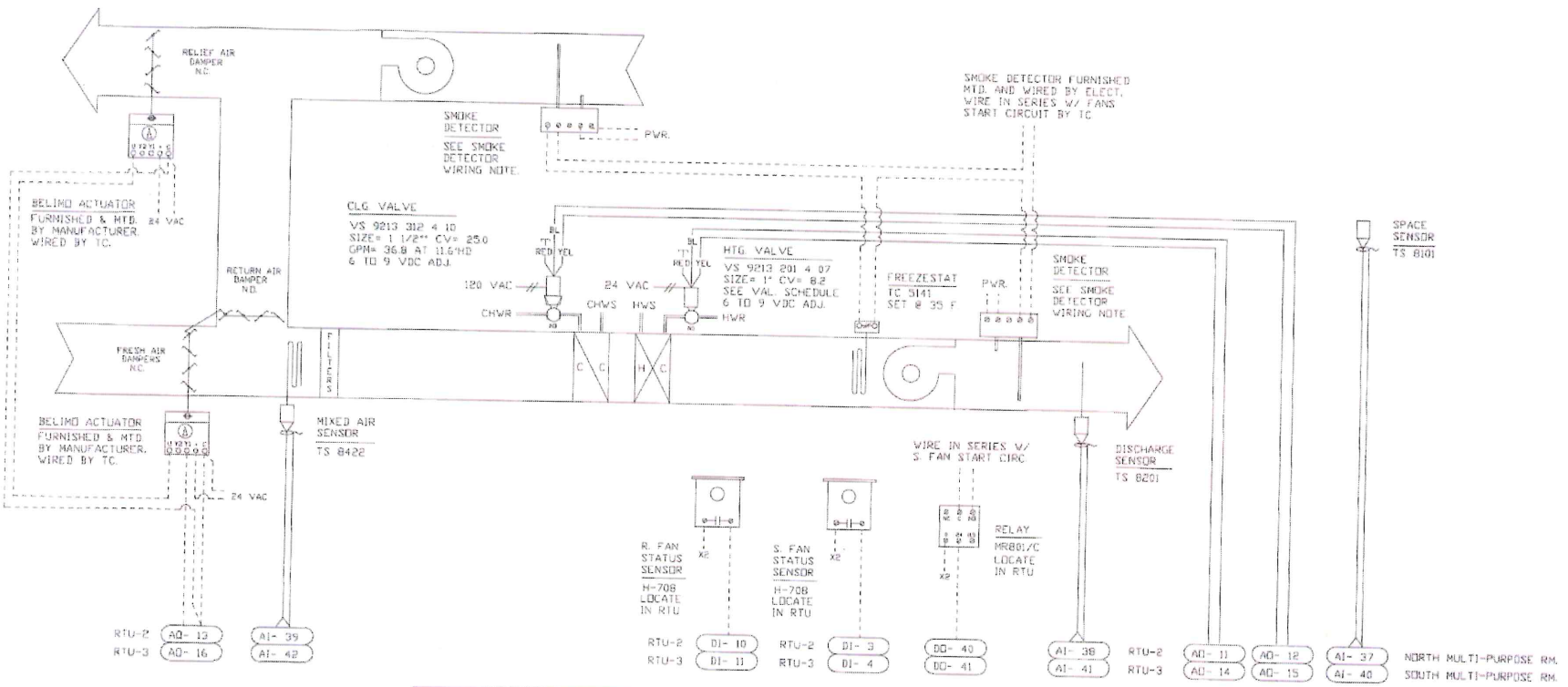
CTI CONTROLLED TEMPERATURE INC.
1697 BEST DRIVE , WALLED LAKE MICH. 48390 TEL. (313) 669-0500

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
< ROOF TOP UNIT #1 MZ ZONE CONTROL LAN-01 >
NEW BALTIMORE MICHIGAN

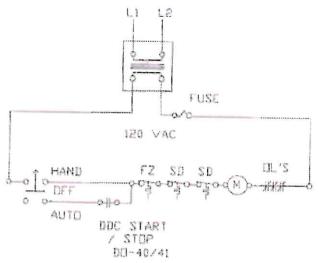
DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
THS		5-5-94	SHEET 10 OF 20	HVAC-302

RTU-2 & 3 AHU CONTROL

LAN ADDRESS 01
TWO LIKE THIS



SUPPLY FAN STARTER WIRING



NEW PAGE

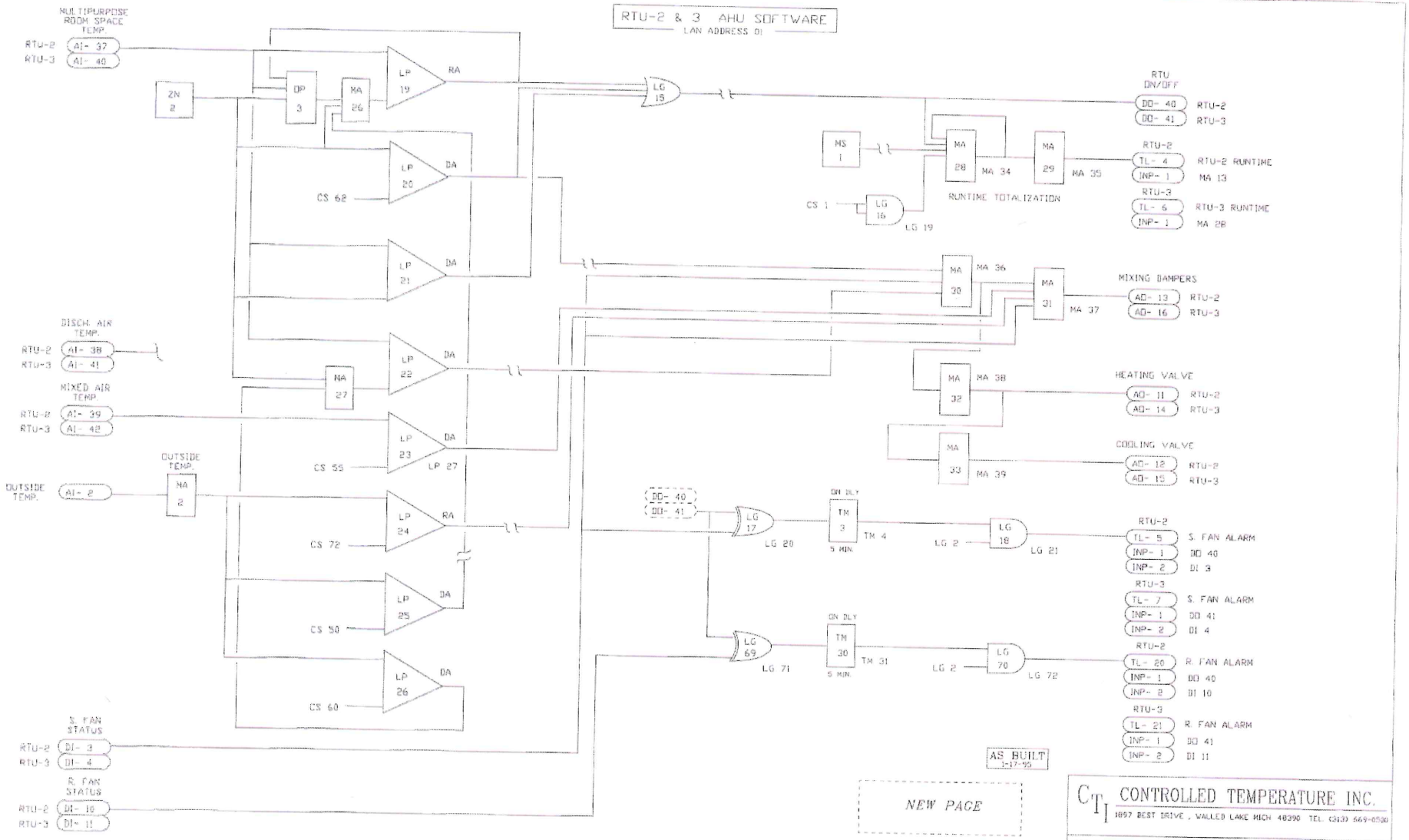
INCLUDE IN BASE BID

AS BUILT 1-17-95

CTI CONTROLLED TEMPERATURE INC.
1697 BEST DRIVE . WALLED LAKE MICH. 48390 TEL (313) 669-0590

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(ROOF TOP UNIT #2 & 3 CONTROL LAN-01)
NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
T.H.S.		5-5-94	SHEET 11 OF 20	HVAC-332



CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE, WALLED LAKE MICH. 48390 TEL. (313) 669-0590

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M SCHMIDT ELEMENTARY
(ROOF TOP UNIT #2 & 3 SOFTWARE LAN-01)
NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO
T.H.S.		5-5-94	12 OF 20	HVAC-332

SEQUENCE OF OPERATION FOR BOILER HEATING AND CHILLED WATER SYSTEM

BOILER HEATING SYSTEM CONTROL

THE PERIMETER HOT WATER HEATING (HWH) LOOP CIRCULATING PUMPS CP-1 AND CP-2 CIRCULATING PUMP MOTOR STARTER HAND/OFF/AUTO SWITCHES WILL BE PLACED IN THE " AUTO " POSITION. BOILERS B-1 THROUGH B-3 CONTROL SWITCHES WILL BE PLACED IN THE " ON " POSITION.

ONE PERIMETER HWH CICULATING PUMP (CP-1 OR CP-2) WILL BE DESIGNATED AS THE " LEAD " PUMP AND THE OTHER PUMP WILL BE DESIGNATED AS THE " STAND-BY " PUMP THROUGH OPERATOR COMMAND TO THE CONTROL PAK DDC SYSTEM.

THE BOILER CICULATING PUMP ON/OFF STATUS WILL BE PROVEN TO THE CONTROL PAK DDC SYSTEM BY MEANS OF THE PUMP MOTOR CURRENT SWITCH. IF A " LEAD " PUMP HAS FAILED AS SENSED BY THE PUMP MOTOR CURRENT SWITCH, CONTROL PAK DDC SYSTEM WILL AUTOMATICALLY ENERGIZE THE " STAND-BY " PUMP AND INDICATE A FAILURE ALARM. ONLY ONE PUMP WILL RUN AT ANY TIME. THE " LEAD " PUMP AND " STAND-BY " PUMP WILL BE ALTERNATED EVERY 1000 HOURS THROUGH THE CONTROL PAK DDC SYSTEM.

WHEN THE OUTSIDE AIR TEMPERATURE IS AT OR BELOW 60 DEGREES F. AS DETERMINED BY THE OUTSIDE AIR SENSOR, THE CONTROL PAK DDC SYSTEM WILL START THE " LEAD " HEATING CIRCULATING PUMP.

WHEN THE OUTSIDE AIR TEMPERATURE IS 60 DEGREES OR BELOW THE BOILER MASTER SEQUENCING PANEL WILL BE ACTIVATE THE BOILER CONTROL CIRCUITS AND FULLY MODULATE EACH BOILER IN SEQUENCE TO MAINTAIN THE HOT WATER HEATING SUPPLY TEMPERATURE. EACH INDIVIDUAL BOILER WILL NOT FIRE UNLESS FLOW IS PROVEN BY ITS FLOW SWITCH.

THE HWH SUPPLY TEMPERATURE WILL BE RESET BASED ON OUTSIDE AIR TEMP. RESET SCHEDULE PRE-PROGRAMMED IN THE BOILER MASTER SEQUENCING PANEL.

WHEN THE OUTSIDE AIR TEMPERATURE RISES ABOVE 60 DEGREES F. THE BOILER SYSTEM WILL DE-ACTAVATE.

THE HEATING HOT WATER FLOW METER THROUGH DDC WILL MODULATE THE BY-PASS CONTROL VALVE TO MAINTAIN CONSTANT FLOW THROUGH THE BOILERS.

DURING UNOCCUPIED HOURS WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 50 F. THE CONTROL PAK DDC SYSTEM WILL INITIATE BOILER LOW TEMPERATURE ALARM AND OR BOILER NO FLOW ALARM VIA PHONE MODEM TO THE OWNERS THIRD PARTY MONITORING DISPATCH COMPANY.

NOT INCLUDED IN DDC UPGRADES RFP -
HWS & BOILER CONTROL HAS BEEN INCLUDED WITH BOILER REPLACEMENT PROJECT.

CHILLED WATER SYSTEM CONTROL

THE CHILLED WATER CIRCULATING PUMPS CP-3 AND CP-4 MOTOR STARTER HAND/OFF/AUTO SWITCHES ARE TO BE PLACED IN THE "AUTO" POSITION AND CHILLER CONTROL SWITCHES WILL BE PLACED IN THE "ON" POSITION.

ONE CIRCULATING PUMP CP-3 OR CP-4 WILL BE DESIGNATED AS THE "LEAD" PUMP AND THE OTHER PUMP WILL BE DESIGNATED AS THE "STANDBY" PUMP THROUGH OPERATOR COMMAND TO THE CONTROL PAK DDC SYSTEM.

WHEN THE OUTSIDE AIR TEMP. IS AT 65 DEGREES F. OR ABOVE (ADJ.) AS DETECTED BY THE OUTSIDE AIR SENSOR, THE CONTROL PAK DDC SYSTEM WILL START THE "LEAD" PUMP.

CHILLER CIRCULATING PUMP ON/OFF STATUS WILL BE PROVEN TO THE CONTROL PAK DDC SYSTEM BY MEANS OF THE PUMP MOTOR CURRENT SWITCH. IF THE "LEAD" PUMP HAS FAILED AS SENSED BY THE PUMP MOTOR CURRENT SWITCH, THE CONTROL PAK DDC SYSTEM WILL AUTOMATICALLY START THE "STANDBY" PUMP AND INDICATE A PUMP FAILURE ALARM. ONLY ONE PUMP WILL RUN AT ANY TIME. THE LEAD PUMP AND STANDBY PUMP WILL BE ALTERNATED EVERY 1000 HOURS THROUGH THE CONTROL PAK DDC SYSTEM.

WHEN FLOW IS ESTABLISHEDAS PROVEN TO THE CHILLER CONTROL PANEL BY THE CHILLER DIFFERENTIAL PRESSURE SWITCH. THE CHILLER CONTROL PANEL WILL START THE CHILLER AND MAINTAIN THE REQUIRED CHILLED WATER SUPPLY TEMP.

THE CHILLED WATER FLOW TRANSMITTER THROUGH THE CONTROL PAK DDC SYSTEM WILL MODULATE THE BYPASS CONTROL VALVE TO MAINTAIN A CONSTANT FLOW THROUGH THE CHILLER.

LOW OUTSIDE AIR TEMP. LOCKOUT THERMOSTAT WILL SHUT DOWN THE CHILLER WHEN OUTSIDE AIR TEMP FALLS BELOW IT'S SETPOINT. THE SETPOINT WILL BE SET 10 DEGREES F. HIGHER THAN THE CHILLER MANUFACTURE'S MINIMUM RECOMMENDED ABIENT TEMP.

NOT INCLUDED IN DDC UPGRADES RFP -
CONTROL FOR CHILLED WATER SYSTEM INCLUDED WITH CHILLER REPLACEMENT

AS BUILT 1-17-95

NEW PAGE

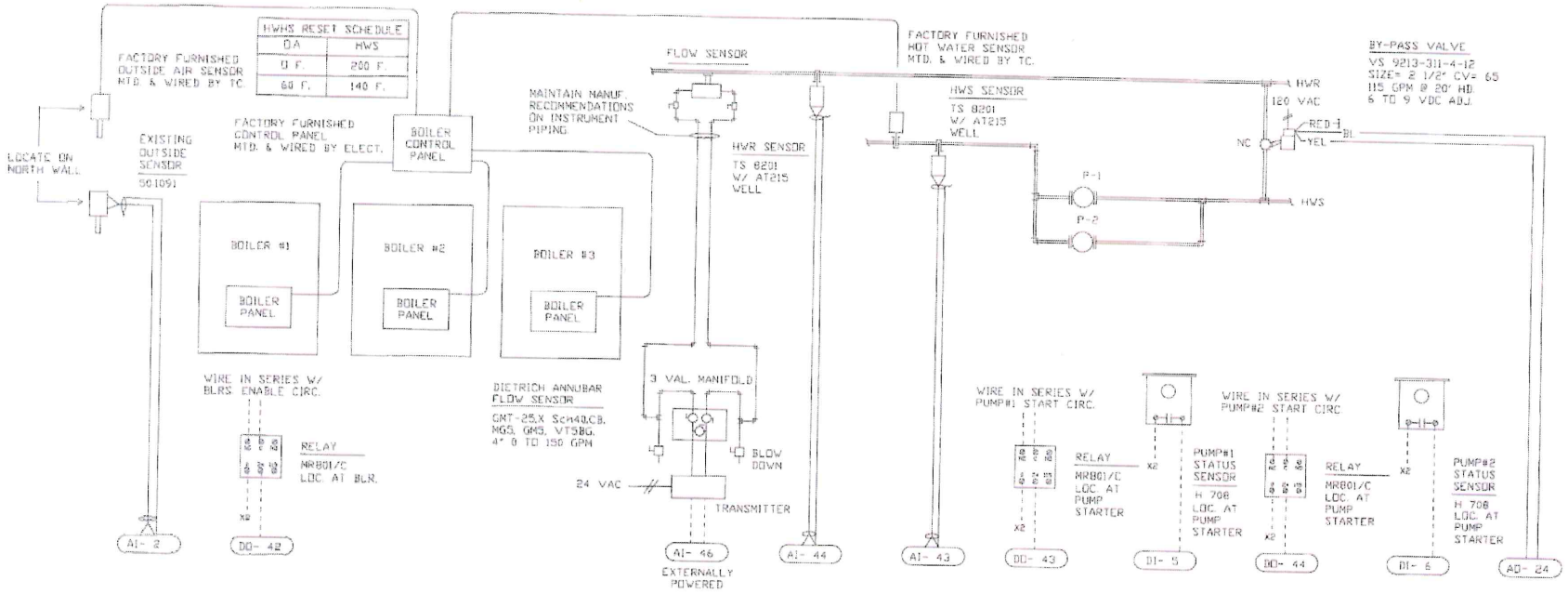
CONTROLLED TEMPERATURE INC.
1697 BEST DRIVE , WALLED LAKE MICH. 48390 TEL (810) 669-0500

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(SEQUENCE OF OPERATION BOILERS AND CHILLER)
NEW BALTIMORE MICHIGAN

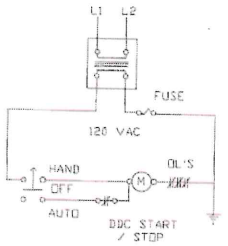
DRAWN BY:	CHECKED BY:	DATE		JOB NO.
THIS		5-17-94	SEQUENCE	HVAC-332

BOILER AND HW HEATING CONTROL

LAN ADDRESS 01



TYPICAL HW PUMP STARTER WIRING



NOT INCLUDED IN DDC UPGRADES RFP - HWS & BOILER CONTROL HAS BEEN INCLUDED WITH BOILER REPLACEMENT PROJECT.

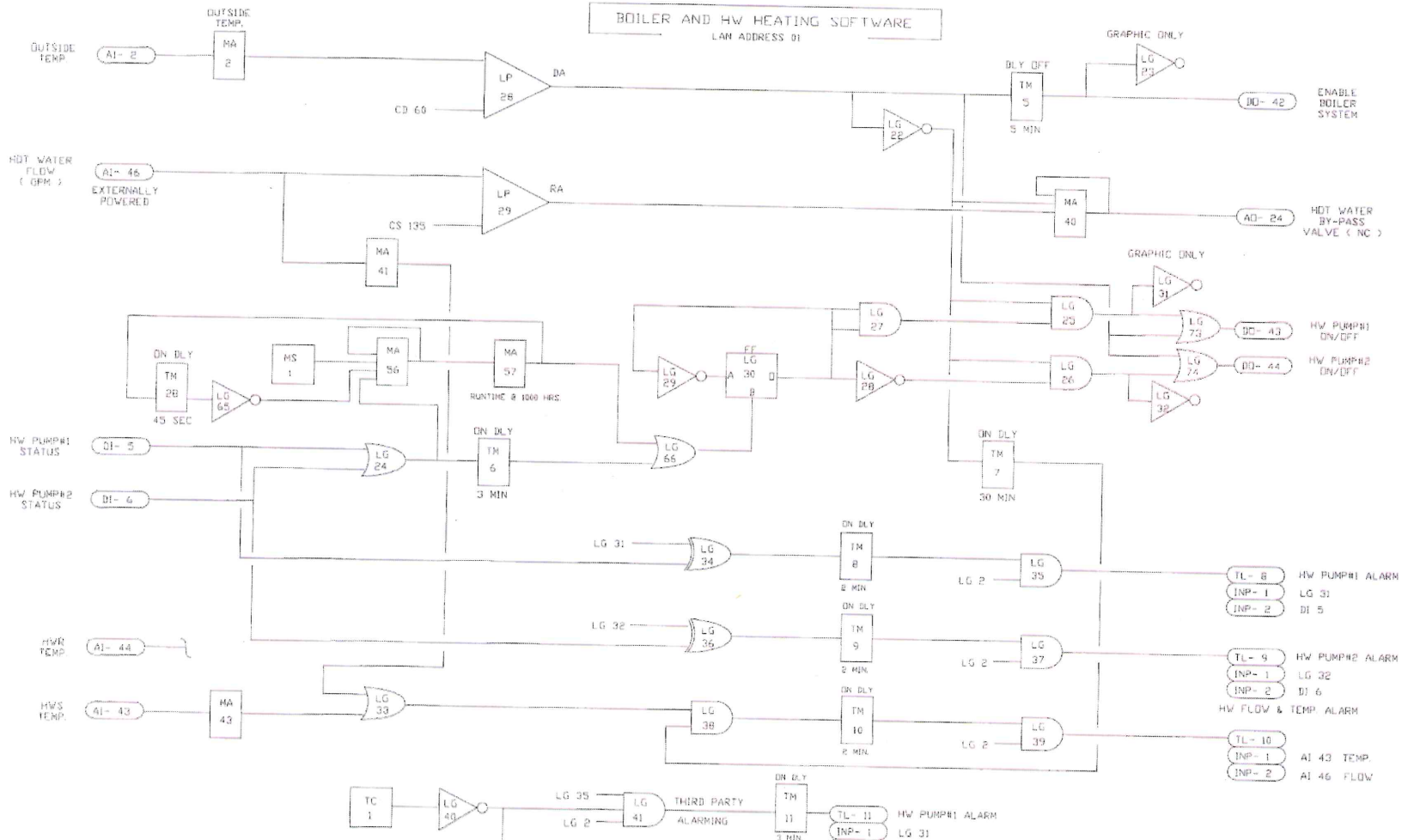
AS BUILT 1-17-95

CTI CONTROLLED TEMPERATURE INC.
1897 WEST DRIVE, WALLED LAKE MICH. 48390 TEL. (313) 669-0506

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(BOILER CONTROL LAN-01)

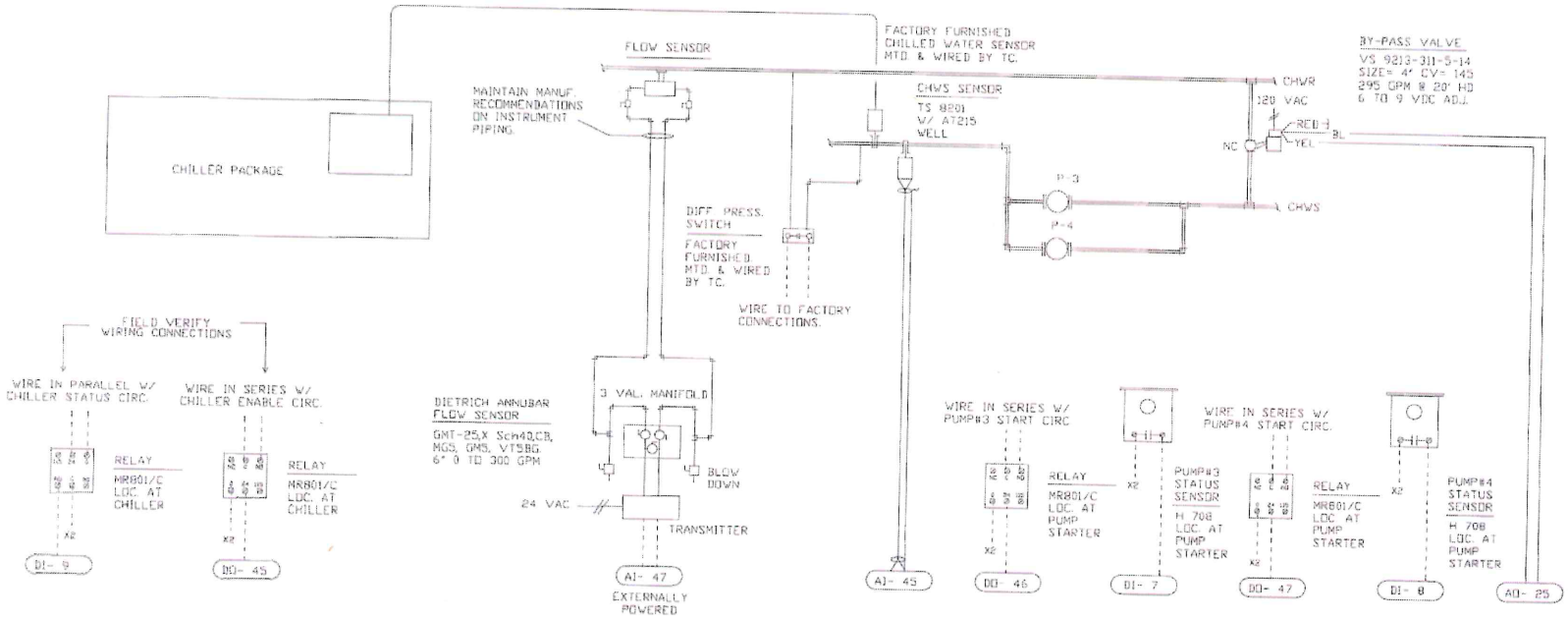
NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO
THIS		5-58-94	SHEET 13 OF 20	HVAC-332

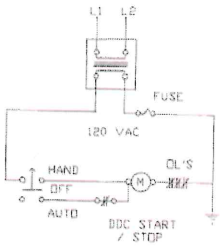

BOILER AND HW HEATING SOFTWARE
LAN ADDRESS 01
OUTSIDE TEMP
AI- 2
OUTSIDE TEMP.
MA 2
LP 28
DA
CD 60
DLY OFF
TM 5
5 MIN
GRAPHIC ONLY
LG 23
DO- 42
ENABLE BOILER SYSTEM
LG 22
HOT WATER FLOW (GPM)
AI- 46
EXTERNALLY POWERED
LP 29
RA
CS 135
MA 41
MA 40
AO- 24
HOT WATER BY-PASS VALVE (NC)
GRAPHIC ONLY
LG 31
LG 27
LG 25
LG 73
DO- 43
HW PUMP#1 ON/OFF
LG 29
LG 28
LG 26
LG 74
DO- 44
HW PUMP#2 ON/OFF
LG 32
ON DLY
TM 28
45 SEC
LG 65
MS 1
MA 56
MA 57
RUNTIME @ 1000 HRS.
FF
LG 30
HW PUMP#1 STATUS
DI- 5
HW PUMP#2 STATUS
DI- 6
LG 24
ON DLY
TM 6
3 MIN
LG 66
ON DLY
TM 7
30 MIN
LG 31
LG 34
ON DLY
TM 8
2 MIN
LG 2
LG 35
TL- 8
HW PUMP#1 ALARM
INP- 1
LG 31
INP- 2
DI 5
LG 32
LG 36
ON DLY
TM 9
2 MIN.
LG 2
LG 37
TL- 9
HW PUMP#2 ALARM
INP- 1
LG 32
INP- 2
DI 6
HWR TEMP.
AI- 44
HWS TEMP.
AI- 43
MA 43
LG 33
LG 38
ON DLY
TM 10
2 MIN.
LG 2
LG 39
TL- 10
HW FLOW & TEMP. ALARM
INP- 1
AI 43 TEMP.
INP- 2
AI 46 FLOW
TC 1
LG 40
LG 35
LG 2
LG 41
THIRD PARTY ALARMING
ON DLY
TM 11
3 MIN.
TL- 11
HW PUMP#1 ALARM
INP- 1
LG 31
INP- 2
DI 5
LG 37
LG 2
LG 42
THIRD PARTY ALARMING
ON DLY
TM 12
3 MIN.
TL- 12
HW PUMP#2 ALARM
INP- 1
LG 32
INP- 2
DI 6
LG 39
LG 2
LG 43
THIRD PARTY ALARMING
ON DLY
TM 13
3 MIN.
TL- 13
HW FLOW & TEMP. ALARM
INP- 1
AI 43 TEMP.
INP- 2
AI 46 FLOW
NOTE: THIRD PARTY ALARMING WILL GO TO THE ALARM ENGINEERING CO.
NEW PAGE
NOT INCLUDED IN DDC UPGRADES RFP - HWS & BOILER CONTROL HAS BEEN INCLUDED WITH BOILER REPLACEMENT PROJECT.
AS BUILT 1-17-95
CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE, WALLED LAKE MICH 48390 TEL (313) 669-6586
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(BOILER SOFTWARE LAN-01)
NEW BALTIMORE MICHIGAN
DRAWN BY: THIS
UPDATE 1-17-95
DATE 5-5-94
SHEET 14 OF 20
JOB NO. HVAC-332

CHILLER AND CHW COOLING CONTROL

LAN ADDRESS 01



TYPICAL CHW PUMP STARTER WIRING



NEW PAGE

NOT INCLUDED IN DDC UPGRADES RFP - CONTROL FOR CHILLED WATER SYSTEM INCLUDED WITH CHILLER REPLACEMENT

AS BUILT 1-17-95

CTI CONTROLLED TEMPERATURE INC.

3897 REST DRIVE, WALLED LAKE MICH. 48390 TEL. (313) 669-0500

PROJECT:

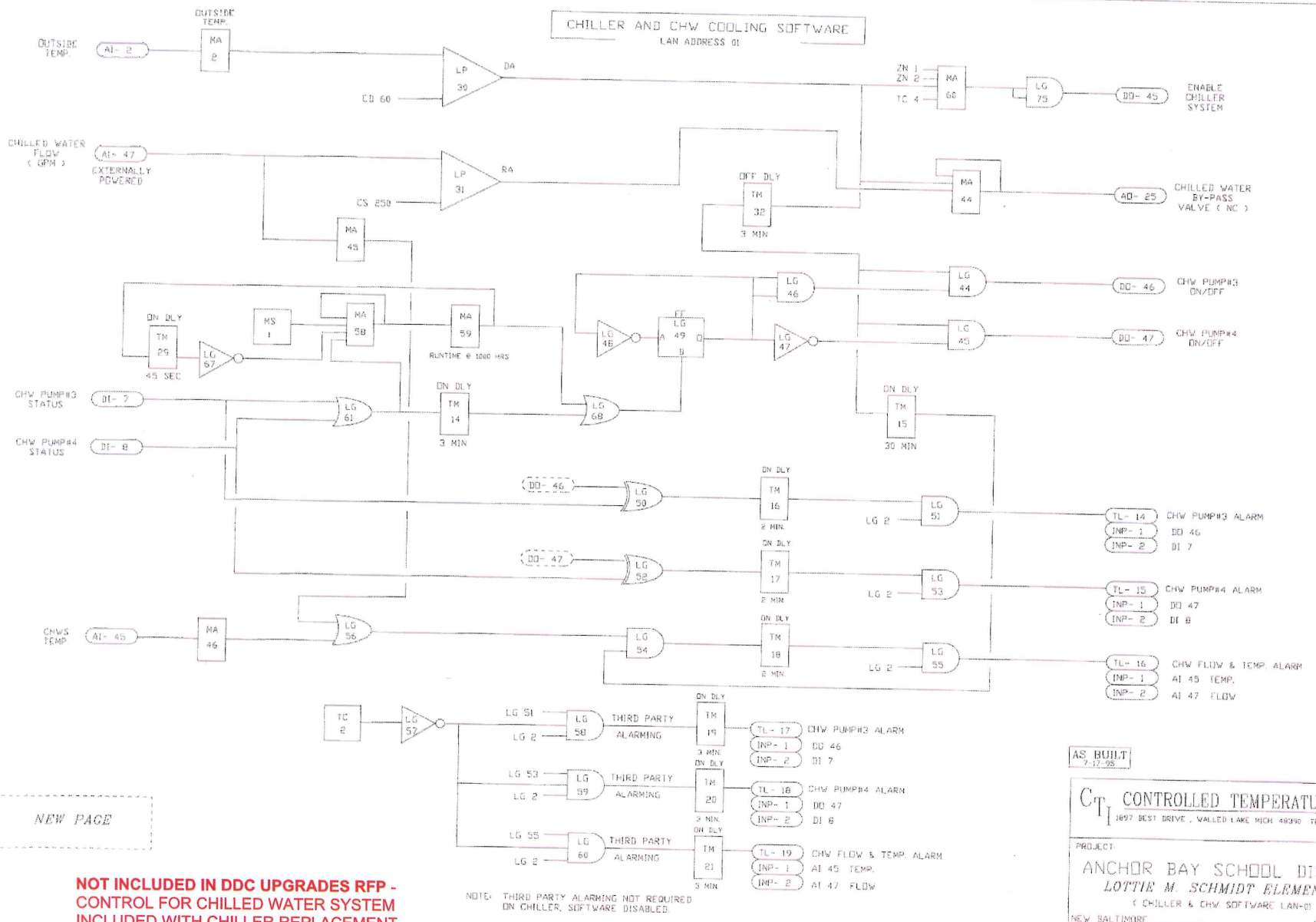
ANCHOR BAY SCHOOL DISTRICT

LOTTIE M. SCHMIDT ELEMENTARY

(CHILLER & CHW CONTROL LAN-01)

NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
THIS		5-5-94	SHEET 13 OF 20	HVAC-332


CHILLER AND CHW COOLING SOFTWARE
LAN ADDRESS 01
OUTSIDE TEMP.
AI- 2
OUTSIDE TEMP.
MA 2
LP 30
DA
CD 60
ZN 1
ZN 2
TC 4
MA 60
LG 75
DO- 45
ENABLE CHILLER SYSTEM
CHILLED WATER FLOW (GPM)
AI- 47
EXTERNALLY POWERED
LP 31
RA
CS 250
MA 45
OFF DLY
TM 32
3 MIN
MA 44
AO- 25
CHILLED WATER BY-PASS VALVE (NC)
ON DLY
TM 29
45 SEC
LG 57
MS 1
MA 58
MA 59
RUNTIME @ 1000 HRS
LG 46
FF
LG 49
A
B
Q
LG 47
LG 46
LG 44
DO- 46
CHW PUMP#3 ON/OFF
LG 45
DO- 47
CHW PUMP#4 ON/OFF
CHW PUMP#3 STATUS
DI- 7
CHW PUMP#4 STATUS
DI- 8
LG 61
ON DLY
TM 14
3 MIN
LG 68
ON DLY
TM 15
30 MIN
DO- 46
LG 50
ON DLY
TM 16
2 MIN.
LG 2
LG 51
TL- 14
CHW PUMP#3 ALARM
INP- 1
DO 46
INP- 2
DI 7
DO- 47
LG 52
ON DLY
TM 17
2 MIN.
LG 2
LG 53
TL- 15
CHW PUMP#4 ALARM
INP- 1
DO 47
INP- 2
DI 8
CHWS TEMP.
AI- 45
MA 46
LG 56
LG 54
ON DLY
TM 18
2 MIN.
LG 2
LG 55
TL- 16
CHW FLOW & TEMP. ALARM
INP- 1
AI 45 TEMP.
INP- 2
AI 47 FLOW
TC 2
LG 62
LG 51
LG 2
LG 58
THIRD PARTY ALARMING
ON DLY
TM 19
3 MIN.
TL- 17
CHW PUMP#3 ALARM
INP- 1
DO 46
INP- 2
DI 7
LG 53
LG 2
LG 59
THIRD PARTY ALARMING
ON DLY
TM 20
3 MIN.
TL- 18
CHW PUMP#4 ALARM
INP- 1
DO 47
INP- 2
DI 8
LG 55
LG 2
LG 60
THIRD PARTY ALARMING
ON DLY
TM 21
3 MIN
TL- 19
CHW FLOW & TEMP. ALARM
INP- 1
AI 45 TEMP.
INP- 2
AI 47 FLOW
NOTE: THIRD PARTY ALARMING NOT REQUIRED ON CHILLER, SOFTWARE DISABLED.
NEW PAGE
NOT INCLUDED IN DDC UPGRADES RFP -
CONTROL FOR CHILLED WATER SYSTEM
INCLUDED WITH CHILLER REPLACEMENT
AS BUILT
7-17-95
CTI CONTROLLED TEMPERATURE INC.
3697 BEST DRIVE, WALLED LAKE MICH 48390 TEL (313) 669-8590
PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(CHILLER & CHW SOFTWARE LAN-01)
NEW BALTIMORE
MICHIGAN
DRAWN BY: THIS
CHECKED BY:
DATE 5-5-94
SHEET 16 OF 20
JOB NO. HVAC-332

SEQUENCE OF OPERATION FOR UNIT VENTS, FAN COIL UNITS, UH, CUH, RADIATION, RADIANT PANELS AND EXHAUST FANS

UNIT VENTILATORS

THE CONTROL PAK DDC SYSTEM WILL ISSUE A COMMAND TO THE UNIT VENTILATOR CONTROLLER TO ENERGIZE OR DE-ENERGIZE THE OCCUPIED OR UNOCCUPIED MODE.

THE SPACE TEMP. SETPOINT WILL BE MANUALLY ADJUSTABLE AT THE WALL MOUNTED SPACE TEMP. SENSOR. THE SPACE TEMP. SENSOR MANUAL ADJUSTMENT WILL BE LIMITED TO A SETPOINT RANGE OF 70 F. TO 75 F. AS PROGRAMMED THROUGH THE UNIT VENTILATOR DDC CONTROLLER.

DURING THE WARMUP CYCLE THE OUTSIDE AIR DAMPER AND THE RELIEF AIR DAMPER WILL BE FULLY CLOSED AND THE RETURN AIR DAMPER AND HEATING COIL VALVE WILL BE FULLY OPEN.

WHEN THE WARMUP CYCLE IS COMPLETED AND THE DESIRED SPACE TEMP. IS REACHED, THE OUTSIDE AIR DAMPER WILL OPEN TO MINIMUM POSITION OR AS REQUIRED. THE HEATING COIL VALVE WILL MODULATE THROUGH THE UNIT VENTILATOR CONTROLLER TO MAINTAIN THE DESIRED SPACE TEMP.

IF THE SPACE TEMP. CONTINUES TO EXCEED ITS SETPOINT WHEN OUTSIDE AIR DAMPERS ARE FULLY OPEN AND THE OUTSIDE AIR TEMP. IS ABOVE 55 F. THEN MECHANICAL COOLING SHOULD OCCUR. THE OUTSIDE AIR DAMPERS WILL CLOSE TO A MINIMUM POSITION. THE SPACE SENSOR WILL MODULATE THE COOLING COIL CONTROL VALVE THROUGH THE UNIT VENTILATOR CONTROLLER TO MAINTAIN SPACE TEMP.

DURING THE UNOCCUPIED MODE THE UNIT VENTILATORS WILL IN FULL RECIRCULATION MODE TO MAINTAIN NIGHT SETBACK TEMP AS DETERMINED BY THE UNIT VENTILATORS DDC CONTROLLER.

FAN COIL UNIT CONTROL

THE CONTROL PAK DDC SYSTEM WILL ISSUE A DAY/NIGHT MODE COMMAND TO THE FAN COIL UNIT DDC CONTROLLER BASED ON A PRE-PROGRAMMED SCHEDULE.

THE SPACE TEMP. SETPOINT WILL BE MANUALLY ADJUSTABLE AT THA WALL MOUNTED SPACE TEMP. SENSOR. THE SPACE TEMP. MANUAL ADJUSTMENT WILL BE LIMITED TO A SETPOINT RANGE OF 70 F. TO 75 F. AS PROGRAMMED THROUGH THE FAN COIL UNIT DDC CONTROLLER.

DURING THE DAY MODE THE FAN COIL UNIT WILL BE STARTED AND RUN CONTINUOUSLY WITH THE OUTSIDE AIR DAMPER OPEN TO THE 30 CFM MINIMUM OUTSIDE AIR POSITION. THE ROOM SENSOR THROUGH THE FAN COIL UNIT CONTROLLER WILL CONTROL THE FAN'S THREE SPEEDS AND MODULATE THE HEATING COIL CONTROL VALVE AND COOLING COIL CONTROL VALVE IN SEQUENCE TO MAINTAIN SPACE TEMP. SETPOINT.

DURING THE NIGHT MODE THE FAN COIL UNIT WILL BE CYCLED ON AND OFF WITH THE OUTSIDE AIR DAMPER CLOSED AND THE HEATING COIL VALVE FULLY OPEN TO MAINTAIN A SETBACK TEMP. OF 50 F.

WHENEVER THE FAN COIL UNIT IS DE-ENERGIZED THE OUTSIDE AIR DAMPER AND HEATING COIL VALVE WILL BE FULLY CLOSED.

HOT WATER UNIT HEATER CONTROL

UPON A CALL FOR HEATING FROM THE ROOM THERMOSTAT THE HWH COIL CONTROL VALVE WILL OPEN AND THE UH HEATER FAN WILL BE CYCLED ON. WHEN THE ROOM THERMOSTAT SETOINT IS REACHED, THE HWH COIL CONTROL VALVE WILL CLOSE AND THE UH FAN WILL BE CYCLED OFF.

AQUASTAT WILL BE WIRED TO THE FAN TO PREVENT FAN OPERATION WHEN HEAT IS NOT AVAILABLE.

CABINET UNIT HEATER CONTROL

UPON A CALL FOR HEATING FROM THE ROOM THERMOSTAT THE HWH COIL CONTROL VALVE WILL OPEN AND THE CUH HEATER FAN WILL BE CYCLED ON. WHEN THE ROOM THERMOSTAT SETOINT IS REACHED, THE HWH COIL CONTROL VALVE WILL CLOSE AND THE CUH FAN WILL BE CYCLED OFF.

AQUASTAT WILL BE WIRED TO THE FAN TO PREVENT FAN OPERATION WHEN HEAT IS NOT AVAILABLE.

RADIATION CONTROL

ROOM THERMOSTAT WILL MODULATE THE RADIATION CONTROL VALVE TO MAINTAIN ROOM TEMP. SETPOINT.

RADIANT PANEL CONTROL

ROOM THERMOSTAT WILL MODULATE THE RADIANT PANEL CONTROL VALVE TO MAINTAIN ROOM TEMP. SETPOINT.

EXHAUST FAN CONTROL

EXHAUST FANS WILL RUN DURING THE OCCUPIED MODE AND WILL BE OFF DURING THE UNOCCUPIED MODE AS DETERMINED BY THE CONTROL PAK DDC SYSTEM PRE-PROGRAMMED SCHEDULE.

BOILER ROOM HEATING AND VENTILATION CONTROL

UPON A CALL FOR HEATING FROM THE ROOM SENSOR, SETPOINT A 68 DEGREES F., THE HEATER HOT WATER CONTROL VALVE WILL OPEN AND THE UNIT HEATER FAN WILL CYCLE ON. WHEN THE ROOM SENSOR SETPOINT POINT IS REACHED, THE UNIT HEATER HOT WATER VALE WILL CLOSE AND THE FAN WILL CYCLE OFF.

WHEN HOT WATER IS NOT AVAILABLE THE UNIT HEATER FAN OPERATION WILL BE PREVENTED.

WHENEVER MECHANICAL ROOM TEMP. RISES ABOVE 80 F. THE ROOM SENSOR WILL MODULATE THE HIGH AND LOW VENTILATION DAMPERS TOWARDS OPEN TO MAINTAIN ROOM TEMP.

AS BUILT
1-12-95

INCLUDE IN BASE BID

NEW PAGE

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE, WALLED LAKE MICH. 48390 TEL (810) 669-9300

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(SEQUENCE OF OPERATION BOILERS AND CHILLER)
NEW BALTIMORE MICHIGAN

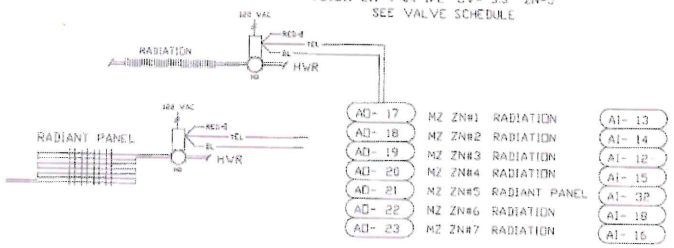
DRAWN BY:	CHECKED BY:	DATE	SEQUENCE	JOB NO.
THIS		5-17-94		HVAC-332

ZONE CONTROLLED RADIATION/RADIANT PANEL

LAN ADDRESS 01
SEVEN LIKE THIS

TWO WAY CONTROL VALVE

VS9211-211-4-01 1/2" CV= 0.4 ZN-1,2 & 7
VS9211-211-4-02 1/2" CV= 1.3 ZN-3,4 & 6
VS9211-211-4-04 1/2" CV= 3.3 ZN-5
SEE VALVE SCHEDULE

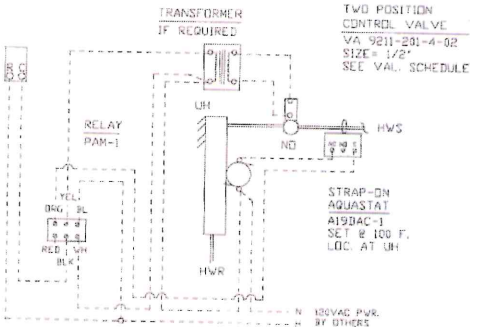


AO- 17	MZ ZN#1	RADIATION	AI- 13
AO- 18	MZ ZN#2	RADIATION	AI- 14
AO- 19	MZ ZN#3	RADIATION	AI- 12
AO- 20	MZ ZN#4	RADIATION	AI- 15
AO- 21	MZ ZN#5	RADIANT PANEL	AI- 32
AO- 22	MZ ZN#6	RADIATION	AI- 18
AO- 23	MZ ZN#7	RADIATION	AI- 16

UNIT HEATER & CABINET UNIT HEATER CONTROL

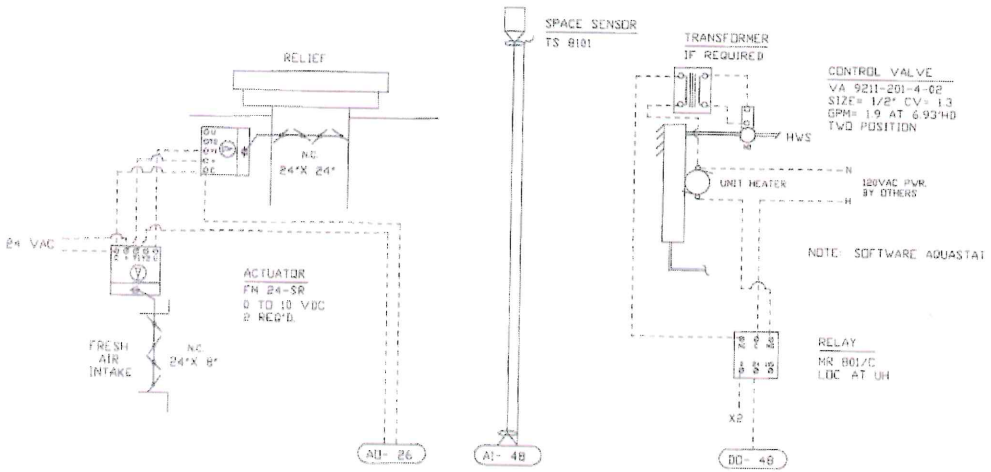
LAN ADDRESS 01
TEN LIKE THIS

THERMOSTAT
TA 1101
SET @ 68 F.
OPENS ON RISE



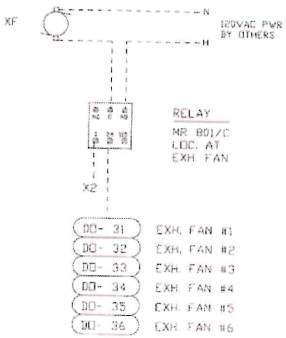
BOILER RM. UNIT HEATER AND VENTILATION CONTROL

LAN ADDRESS 01



EXHAUST FAN CONTROL

LAN ADDRESS 01
SIX LIKE THIS



DO- 31	EXH. FAN #1
DO- 32	EXH. FAN #2
DO- 33	EXH. FAN #3
DO- 34	EXH. FAN #4
DO- 35	EXH. FAN #5
DO- 36	EXH. FAN #6

AS BUILT
1-17-95

INCLUDE IN BASE BID

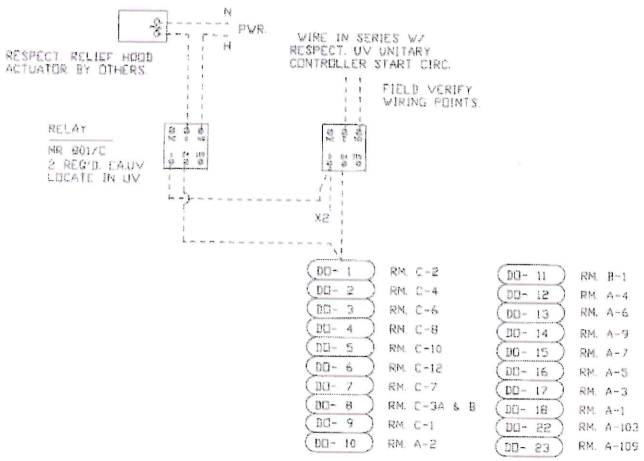
CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE . WALLED LAKE MICH. 48390 TEL. (313) 669-0560

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(RADIATION, XF, RP, UH & CUH CONTROL LAN-01)
NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
THIS		5-5-94	SHEET 17 OF 20	HVAC-332

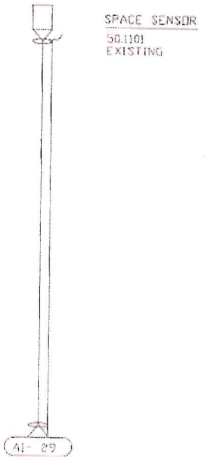
UNIT VENTILATOR DAY/NIGHT CHANGE-OVER CONTROL

LAN ADDRESS 01
20 LIKE THIS



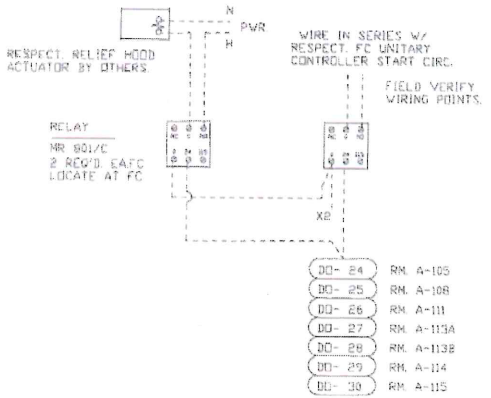
EXISTING RM-B15 CONTROL

LAN ADDRESS 01



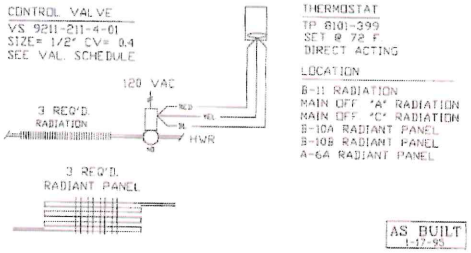
FAN COIL UNITS DAY/NIGHT CHANGE-OVER CONTROL

LAN ADDRESS 01
SEVEN LIKE THIS



RADIATION & RADIANT PANEL CONTROL

SIX LIKE THIS



NEW PACE

AS BUILT
1-17-95

INCLUDE IN BASE BID

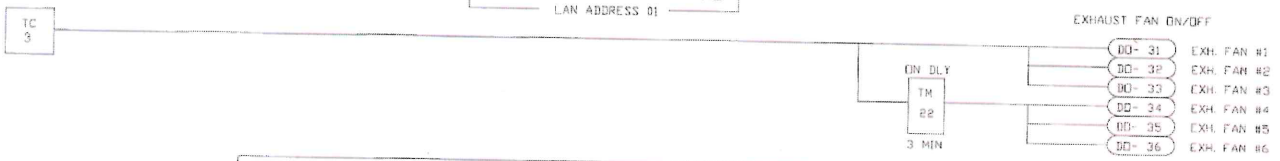
CTI CONTROLLED TEMPERATURE INC.
1697 BEST DRIVE, WALLED LAKE MICH. 48390 TEL. (313) 669-0500

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(RAD, RP, UV & FC CONTROL LAN-01)
NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO.
THIS		3-5-94	SHEET 18 OF 20	HVAC-332

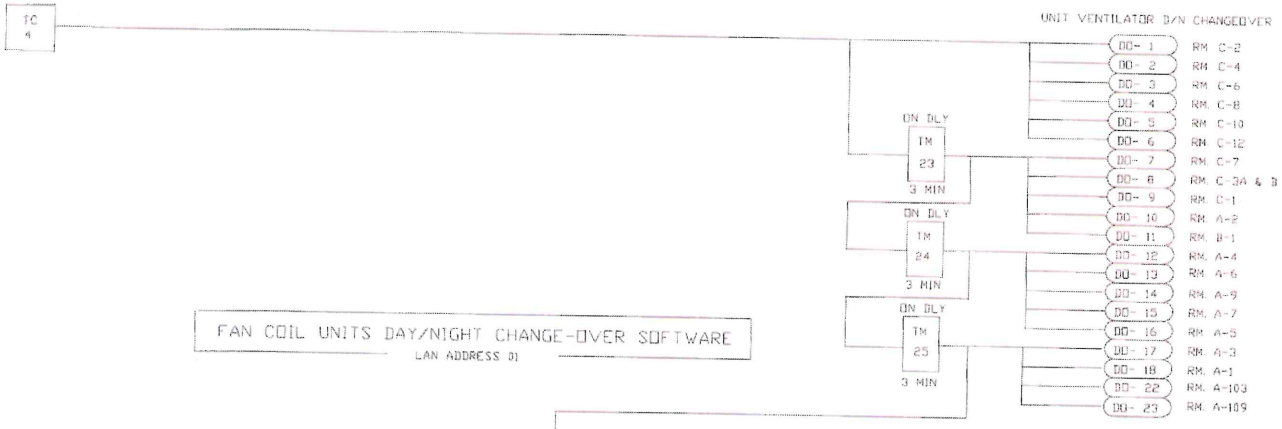
EXHAUST FAN SOFTWARE

LAN ADDRESS 01



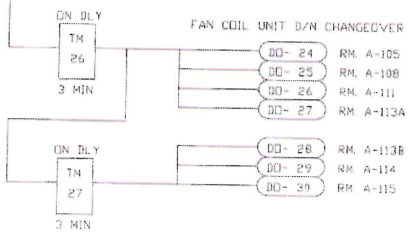
UNIT VENTILATOR DAY/NIGHT CHANGE-OVER SOFTWARE

LAN ADDRESS 01



FAN COIL UNITS DAY/NIGHT CHANGE-OVER SOFTWARE

LAN ADDRESS 01



NEW PAGE

INCLUDE IN BASE BID

AS BUILT
1-17-95

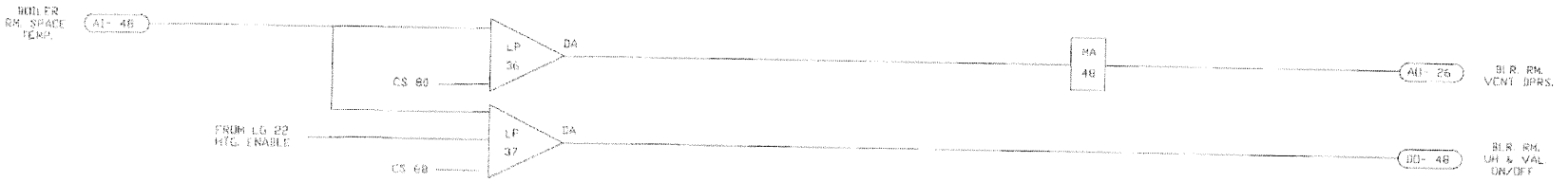
CONTROLLED TEMPERATURE INC.
1697 WEST DRIVE, WALLED LAKE MICH 48390 TEL. (313) 669-8580

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(XF, UV & FC SOFTWARE LAN-01)
NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET	JOB NO
THS		5-5-94	19 OF 20	HVAC-332

EXISTING RM. B-15 SCUV SOFTWARE
LAN ADDRESS 01

BOILER RM. UNIT HEATER & VENTILATION SOFTWARE
LAN ADDRESS 01



AS BUILT
3-17-95

NEW PAGE

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE, WALLED LAKE MICH 48390 TEL (313) 669-0560

PROJECT:
ANCHOR BAY SCHOOL DISTRICT
LOTTIE M. SCHMIDT ELEMENTARY
(BLR RM UH & RM BIS SOFTWARE LAN-01)

NEW BALTIMORE MICHIGAN

DRAWN BY:	CHECKED BY:	DATE	SHEET 20 OF 20	JOB NO.
THIS		5-5-94		HVAC-332

OWNER:

ANCHOR BAY SCHOOL DISTRICT

CONSULTING ENGINEERS

PETER BASSO ASSOCIATES, INC.

ARCHITECT PLANNERS INTERIORS

FRENCH ASSOCIATES

CONSTRUCTION MANAGERS

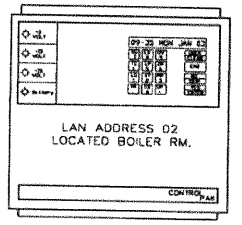
BARTON MALOW

MECHANICAL CONTRACTOR:

BLB INDUSTRIES

DDC SYSTEM ARCHITECTURE

EM-Solution W/LTU FIELD PROCESSOR



INDEX

ANCHOR BAY SCHOOL DISTRICT
LOTTIE SCHMIDT ELEMENTARY SCHOOL
ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

SYSTEM: SYSTEM ARCHITECTURE/INDEX

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE , WALLED LAKE MICH. 48390 TEL (248) 669-0580

FILE NAME: TITLE BLOCK.dwg
DRAWN BY: KDS DATE: 04-17-01 JOB NO. 00-146

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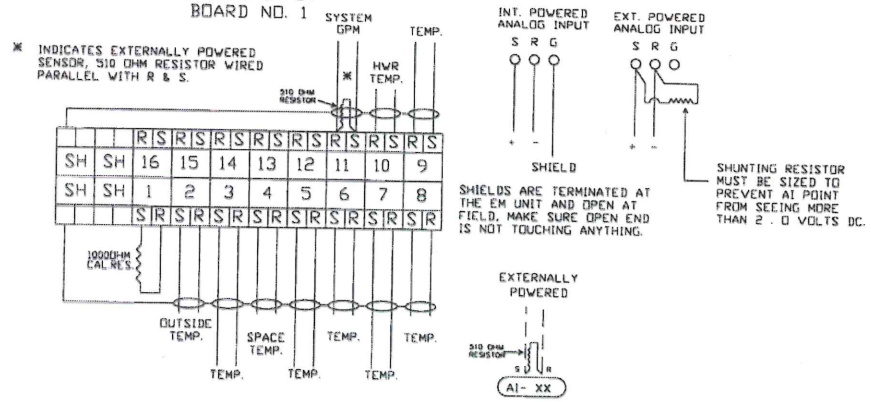

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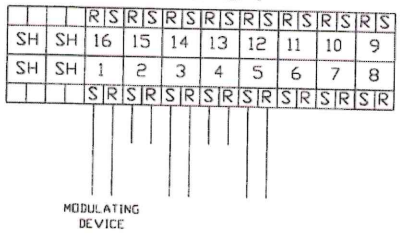

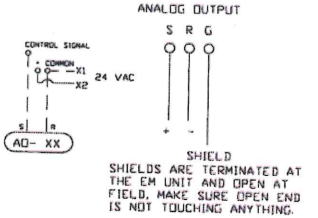

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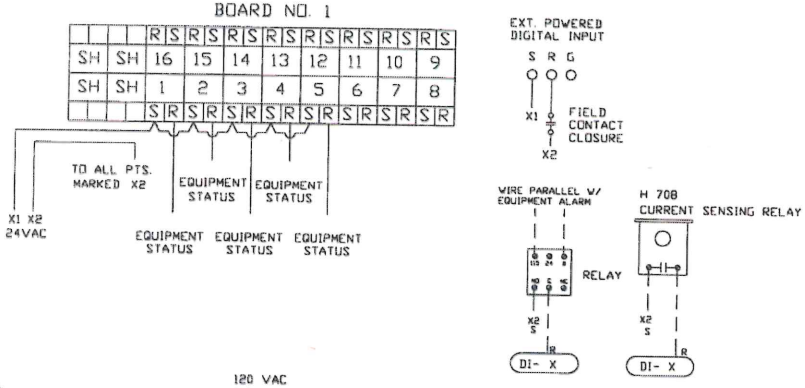

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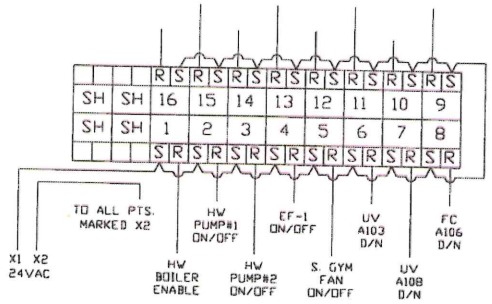
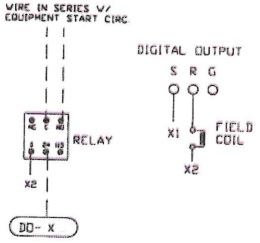
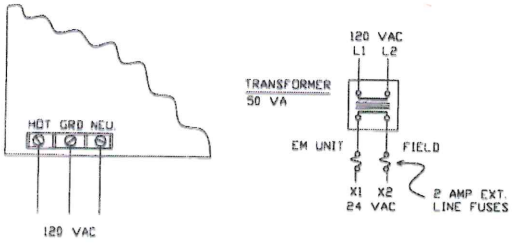






INCLUDE IN BASE BID

ANCHOR BAY SCHOOL DISTRICT *LOTTIE SCHMIDT ELEMENTARY SCHOOL* ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041	SYSTEM: EM SSL STANDARD TERMINAL CONNECTIONS	CTI CONTROLLED TEMPERATURE INC. 1897 BEST DRIVE, WALLED LAKE MICH. 48390 TEL. (248) 669-0500 FILE NAME: STANDARD TERMINATIONS.dwg ASBUILT BY: KDS DATE: 04-17-01 JOB NO. 00-146	02 PAGE NUMBER

ANALOG INPUT BOARD #01

AI#	POINT DESCRIPTION	EQUIPMENT	AREA SERVED
01	CALIBRATION RESISTOR	EM UNIT	BUILDING
02	MIXED AIR TEMP.	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
03	DISCH. AIR TEMP.	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
04	SPACE TEMP.	RHC	CORR. A111
05	SPACE TEMP.	RHC	CORR. A112
06	SPACE TEMP.	RHC	CAFETERIA A113
07	SPACE TEMP.	RHC	KITCHEN A120
08	SPACE TEMP.	RHC	PLATFORM A114
09	SPACE TEMP.	RHC	MUSIC STORAGE A119
10	SPACE TEMP.	RHC	MUSIC A118
11	SPACE TEMP.	RTU-2	MIXED AIR TEMP.
12	SPACE TEMP.	RTU-2	DISCH. AIR TEMP.
13	SPACE TEMP.	RHC	COMPUTER LAB B113
14	SPACE TEMP.	RHC	MEDIA CENTER B112
15	SPACE TEMP.	RHC	MEDIA CENTER B112
16	SPACE TEMP.	RHC	CORR. A110

ANALOG INPUT BOARD #02

AI#	POINT DESCRIPTION	EQUIPMENT	AREA SERVED
17	SPACE TEMP.	RHC	STORAGE B114
18	SPARE		
19	SPARE		
20	SPARE		
21	SPARE		
22	SPARE		
23	SPARE		
24	SPARE		
25	SPARE		
26	SPARE		
27	SPARE		
28	SPARE		
29	SPARE		
30	SPARE		
31	SPARE		
32	SPARE		

DIGITAL INPUT BOARD #01

DI#	POINT DESCRIPTION	EQUIPMENT	AREA SERVED
01	FILTER STATUS	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
02	FAN STATUS	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
03	FILTER STATUS	RTU-2	MEDIA CENTER, COMPUTER LAB
04	FAN STATUS	RTU-2	MEDIA CENTER, COMPUTER LAB
05	SPARE		
06	SPARE		
07	SPARE		
08	SPARE		
09	SPARE		
10	SPARE		
11	SPARE		
12	SPARE		
13	SPARE		
14	SPARE		
15	SPARE		
16	SPARE		

ANALOG OUTPUT BOARD #01 (VOLTAGE)

AO#	POINT DESCRIPTION	EQUIPMENT	AREA SERVED
01	MIXED AIR DAMPERS	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
02	HW VALVE	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
03	HW VALVE	RHC	CORR. A111
04	HW VALVE	RHC	CORR. A112
05	HW VALVE	RHC	CAFETERIA A113
06	HW VALVE	RHC	KITCHEN A120
07	HW VALVE	RHC	PLATFORM A114
08	HW VALVE	RHC	MUSIC STORAGE A119
09	HW VALVE	RHC	MUSIC A118
10	HW VALVE	RHC	COMPUTER LAB B113
11	HW VALVE	RHC	MEDIA CENTER B112
12	HW VALVE	RHC	MEDIA CENTER B112
13	HW VALVE	RHC	CORR. A110
14	HW VALVE	RHC	STORAGE B114
15	HW VALVE	RAD. PNL.	CAFETERIA A113
16	HW VALVE	RAD. PNL.	MUSIC A118

ANALOG OUTPUT BOARD #02 (VOLTAGE)

AO#	POINT DESCRIPTION	EQUIPMENT	AREA SERVED
17	MIXED AIR DAMPERS	RTU-2	MEDIA CENTER, COMPUTER LAB
18	SPARE		
19	SPARE		
20	SPARE		
21	SPARE		
22	SPARE		
23	SPARE		
24	SPARE		
25	SPARE		
26	SPARE		
27	SPARE		
28	SPARE		
29	SPARE		
30	SPARE		
31	SPARE		
32	SPARE		

DIGITAL OUTPUT BOARD #01

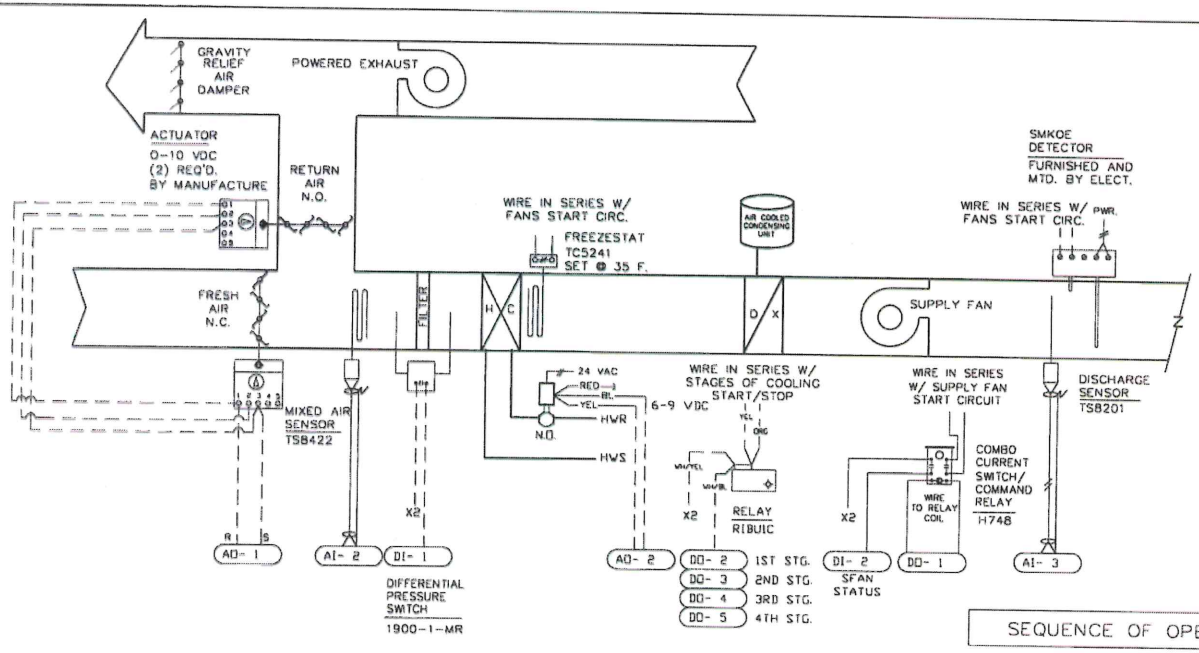
DO#	POINT DESCRIPTION	EQUIPMENT	AREA SERVED
01	S.FAN ON/OFF	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
02	1ST STAGE COOLING	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
03	2ND STAGE COOLING	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
04	3RD STAGE COOLING	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
05	4TH STAGE COOLING	RTU-1	CAFE, KITCH, PLATFORM, MUSIC
06	S.FAN ON/OFF	RTU-2	MEDIA CENTER, COMPUTER LAB
07	1ST STAGE COOLING	RTU-2	MEDIA CENTER, COMPUTER LAB
08	2ND STAGE COOLING	RTU-2	MEDIA CENTER, COMPUTER LAB
09	EXH. FANS ON/OFF	EF-1&2	KITCHEN & TOILET EXHAUST FANS
10	SPARE		
11	SPARE		
12	SPARE		
13	SPARE		
14	SPARE		
15	SPARE		
16	SPARE		

ANCHOR BAY SCHOOL DISTRICT
LOTTIE SCHMIDT ELEMENTARY SCHOOL
ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

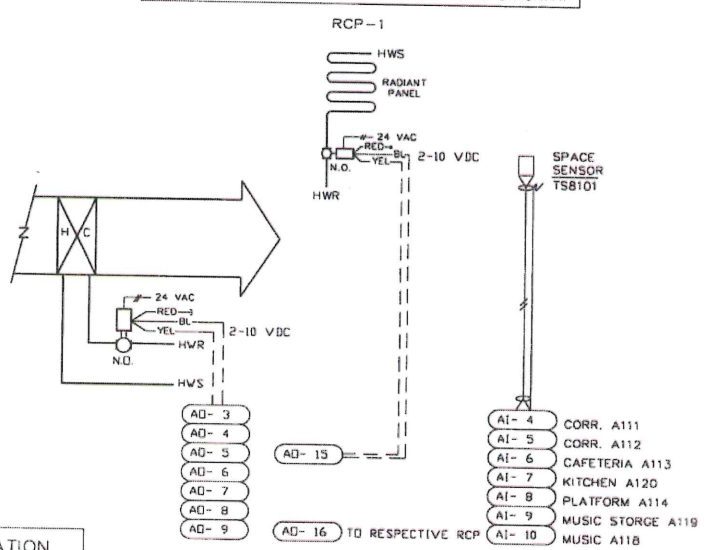
SYSTEM:
I/O POINT DESIGNATIONS
LAN ADDRESS 02

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE, WALLED LAKE MICH. 48390 TEL. (248) 669-8500

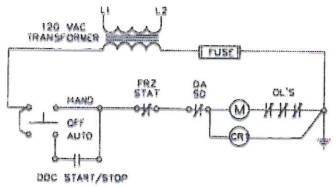
FILE NAME: POINT LAYOUT LAN 2.dwg
AS-BUILT BY: KDS DATE: 07-20-01 JOB NO. 00-146



RADIANT CEILING PANEL CONTROL WIRING DIAGRAM



SUPPLY FAN MOTOR STARTER WIRING



HW VALVE SCHEDULE							
UNIT	PART NO.	CONFIG.	SIZE	CV	GPM	WPD(V)	WPD(C)
RTU-1	VS7211-201-4-04	2-WAY	1/2"	4.4	16.5	4.17"	36.9'
HC-2	VS7211-201-4-03	2-WAY	1/2"	2.2	3.1	1.98"	1.56"
HC-3	VS7211-201-4-02	2-WAY	1/2"	1.3	2.4	3.4"	1.6"
HC-4	VS7211-201-4-08	2-WAY	1"	14	9.9	.55"	.26"
HC-5	VS7211-201-4-03	2-WAY	1/2"	2.2	1.9	.74"	.48"
HC-6	VS7211-201-4-07	2-WAY	1"	10	4.5	.20"	.09"
HC-7	VS7211-201-4-02	2-WAY	1/2"	1.3	0.6	.21"	.09"
HC-8	VS7211-201-4-07	2-WAY	1"	10	3.2	.10"	.04"

NOTE: CONTROL VALVE PRESSURE DROP WILL EQUAL 2.5 TIMES THE ASSOCIATED COIL WATER PRESSURE DROP. (MIN. 2.3' MAX. 15')

RADIANT CEILING PANEL HW VALVE SCHEDULE							
UNIT	PART NO.	CONFIG.	SIZE	CV	GPM	WPD(V)	WPD(C)
RCP-1	VS-7211-201-4-02	2-WAY	1/2"	1.3	2.5	3.25"	7.5'

NOTE: CONTROL VALVE PRESSURE DROP WILL EQUAL 2.5 TIMES THE ASSOCIATED COIL WATER PRESSURE DROP. (MIN. 2.3' MAX. 15')

SEQUENCE OF OPERATION

WITH THE SUPPLY FAN MOTOR STARTER HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION, THE SUPPLY FAN WILL BE AUTOMATICALLY STARTED AND STOPPED BASED ON THE OPTIMUM START PROGRAM AND THE OCCUPANCY SCHEDULE AS PROGRAMMED THROUGH THE DIRECT DIGITAL CONTROL SYSTEM (DDC).

DURING THE UNOCCUPIED MODE, THE SUPPLY FAN WILL BE CYCLED "ON" AND "OFF" BY THE NIGHT CYCLE PROGRAM TO MAINTAIN SPACE TEMPERATURE ABOVE 60°F. (ADJ.)
IF THE SUPPLY FAN IS STARTED PRIOR TO THE OCCUPANCY HOUR BY THE OPTIMUM START PROGRAM OR DURING THE NIGHT CYCLE, THE OUTSIDE AIR DAMPER WILL REMAIN CLOSED. THE RETURN AIR DAMPER WILL BE FULLY OPEN.
WHEN THE SUPPLY FAN IS STARTED DURING THE OCCUPANCY PERIOD, THE OUTSIDE AIR DAMPERS WILL OPEN TO MINIMUM POSITION.
PROOF OF FLOW STATUS FOR THE SUPPLY FAN WILL BE PROVEN TO THE DDC SYSTEM BY MEANS OF THE FAN MOTOR CURRENT SWITCH.

THE RTU BUILDING STATIC PRESSURE SENSOR THROUGH THE DDC WILL CYCLE THE RTU EXHUAST FAN ON-OFF AND MODULATE ITS VARIABLE SPEED DRIVE TO MAINTAIN BUILDING STATIC PRESSURE SETPOINT OF +0.2"WG (ADJUSTABLE) WITH RESPECT TO THE OUTDOOR AMBIENT PRESSURE. WHEN THE RTU EXHAUST FAN IS STARTED, THE EXHAUST AIR DAMPER WILL FULLY OPEN. WHEN THE RTU EXHAUST FAN IS DE-ENERGIZED, THE EXHAUST AIR DAMPER WILL FULLY CLOSE.

THE DISCHARGE AIR TEMPERATURE SENSOR THROUGH DDC WILL MODULATE THE OUTSIDE AIR DAMPER, THE RETURN AIR DAMPER AND HEATING COIL VALVE TO MAINTAIN A DISCHARGE AIR TEMPERATURE SET POINT. THE DISCHARGE AIR TEMPERATURE SET POINT WILL BE 56°F. (ADJ.) WHENEVER THE OUTSIDE AIR TEMPERATURE IS 25°F. OR ABOVE AND THE DISCHARGE AIR TEMPERATURE SET POINT WILL BE 60°F. (ADJ.) WHENEVER THE OUTSIDE AIR TEMPERATURE IS 25°F. OR BELOW (ADJ.).

WHEN OUTSIDE AIR TEMPERATURE IS GREATER THAN RETURN AIR TEMPERATURE, OUTSIDE AIR DAMPER WILL BE IN THE MINIMUM POSITION. WHEN OA TEMPERATURE IS GREATER THAN 55°F PERIMETER HEATING VALVES WILL BE FULLY CLOSED.

WHEN HOT WATER HEATING IS AVAILABLE, AS SENSED BY THE BOILER OPERATOR THROUGH THE DDC SYSTEM, THE ZONE SPACE TEMPERATURE SENSOR FURTHEST BELOW ITS SET POINT OF 75°F. (ADJ.) WILL CONTROL THE STAGES OF DIRECT EXPANSION (DX) COOLING TO MAINTAIN SPACE TEMPERATURE
WHEN HOT WATER HEATING IS NOT AVAILABLE, AS SENSED BY THE BOILER OPERATOR THROUGH THE DDC SYSTEM, THE AVERAGE ZONE SPACE TEMPERATURE WILL CONTROL THE STAGES OF THE DX COOLING TO PREVENT THE AVERAGE SPACE TEMPERATURE FROM EXCEEDING 75°F. (ADJ.).

THE ZONE SPACE TEMPERATURE SENSOR, THROUGH DDC, WILL MODULATE ITS RESPECTIVE HOT WATER TEMPERING COIL VALVE AND PERIMETER HEATING VALVE TO MAINTAIN SPACE TEMPERATURE SET POINT. WHEN OA TEMP. IS ABOVE 55°F (ADJ.) THE PERIMETER HEATING VALVES WILL BE FULLY CLOSED.

FILTER DIFFERENTIAL PRESSURE SWITCH WILL ISSUE A DIRTY FILTER ALARM IF ITS SET POINT IS REACHED.

IF SMOKE IS DETECTED IN THE AIR STREAM BY A SMOKE DETECTOR, THE SUPPLY FAN WILL BE DE-ENERGIZED.

IF THE SET POINT OF A FREEZESTAT IS REACHED, THE SUPPLY FAN WILL BE DE-ENERGIZED.

WHEN THE SUPPLY FAN IS DE-ENERGIZED, THE OUTSIDE AIR DAMPER WILL CLOSE AND THE RETURN AIR DAMPER WILL OPEN AND THE DX COOLING WILL BE DE-ENERGIZED.

INCLUDE IN BASE BID

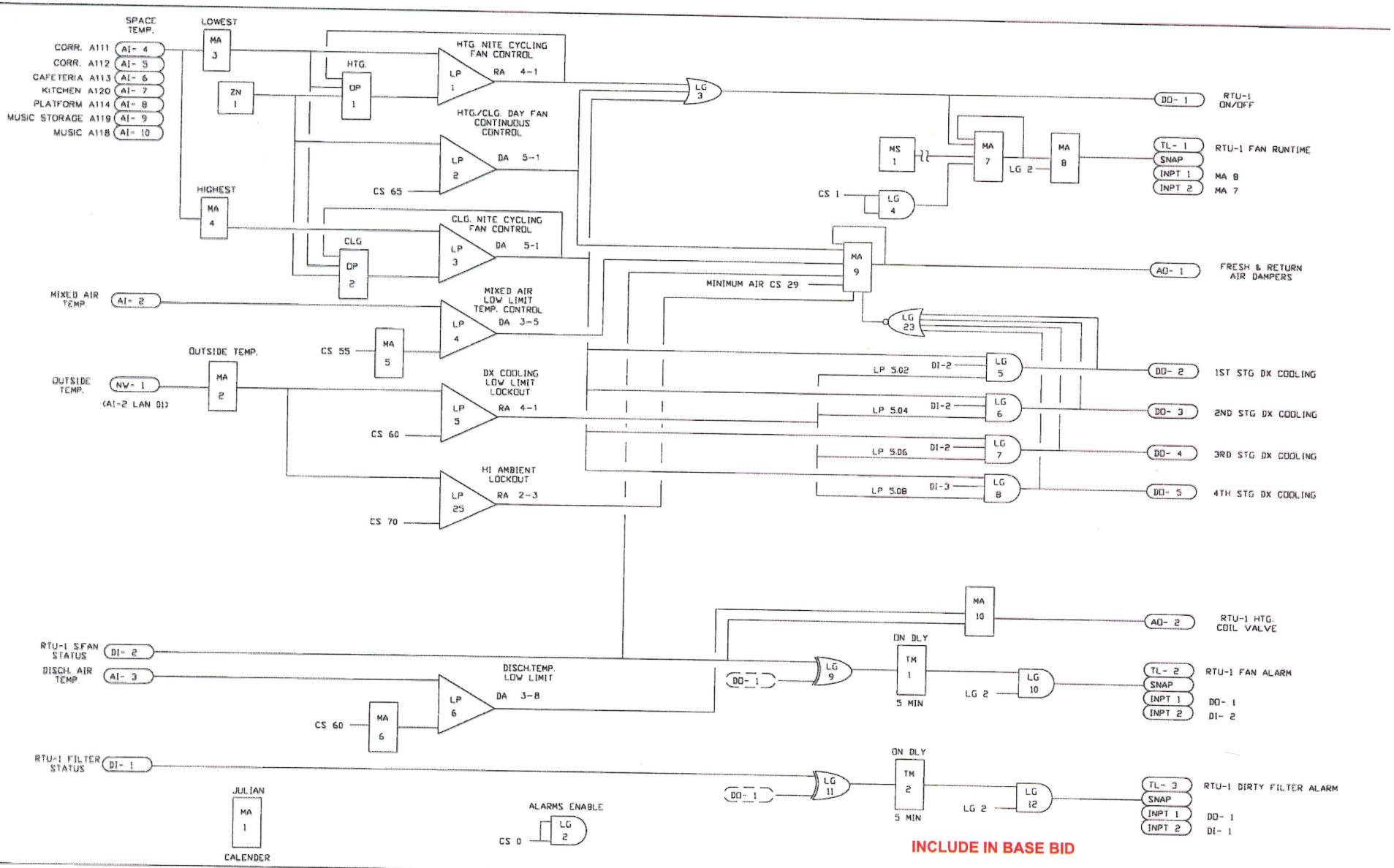
ANCHOR BAY SCHOOL DISTRICT
LOTTIE SCHMIDT ELEMENTARY SCHOOL
ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

SYSTEM:
ROOFTOP UNIT 1 CONTROL WIRING DIAGRAM
LAN ADDRESS 02

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE , WALLED LAKE MICH. 48390 TEL. (248) 669-0500

FILE NAME: RTU-1.dwg
ASBUILT BY: KDS DATE: 07-18-01 JOB NO. 00-146

04A
PAGE NUMBER



ANCHOR BAY SCHOOL DISTRICT

LOTTIE SCHMIDT ELEMENTARY SCHOOL

ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

SYSTEM:

ROOFTOP UNIT 1 CONTROL SOFTWARE DIAGRAM

LAN ADDRESS 02

LOCATED IN THE STORAGE ROOM A121

CTI CONTROLLED TEMPERATURE INC.

1897 BEST DRIVE , WALLED LAKE MICH. 48390 TEL. (248) 669-0500

FILE NAME: RTU-1 LOGIC.dwg

DRAWN BY: KDS DATE: 10-25-01 JOB NO. 00-146

06B

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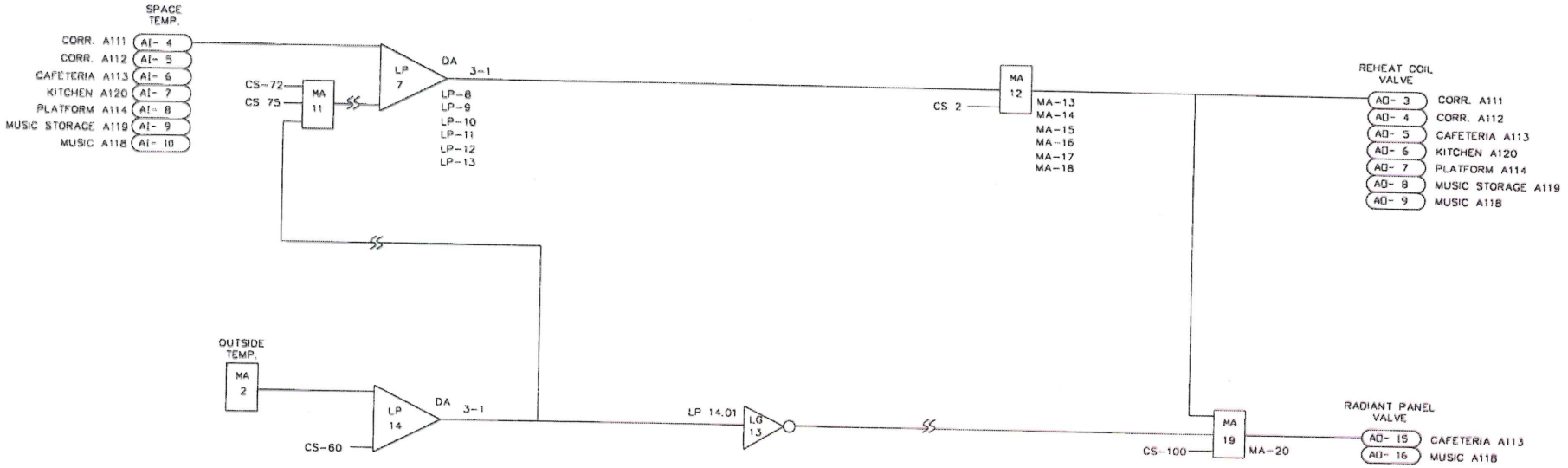

INCLUDE IN BASE BID

ANCHOR BAY SCHOOL DISTRICT
LOTTIE SCHMIDT ELEMENTARY SCHOOL
ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

SYSTEM:
RTU-1 TEMPERING COIL CONTROL SOFTWARE DIAGRAM
LAN ADDRESS 02
LOCATED IN THE STORAGE ROOM A121

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE , WALLED LAKE MICH. 48390 TEL. (248) 669-0500

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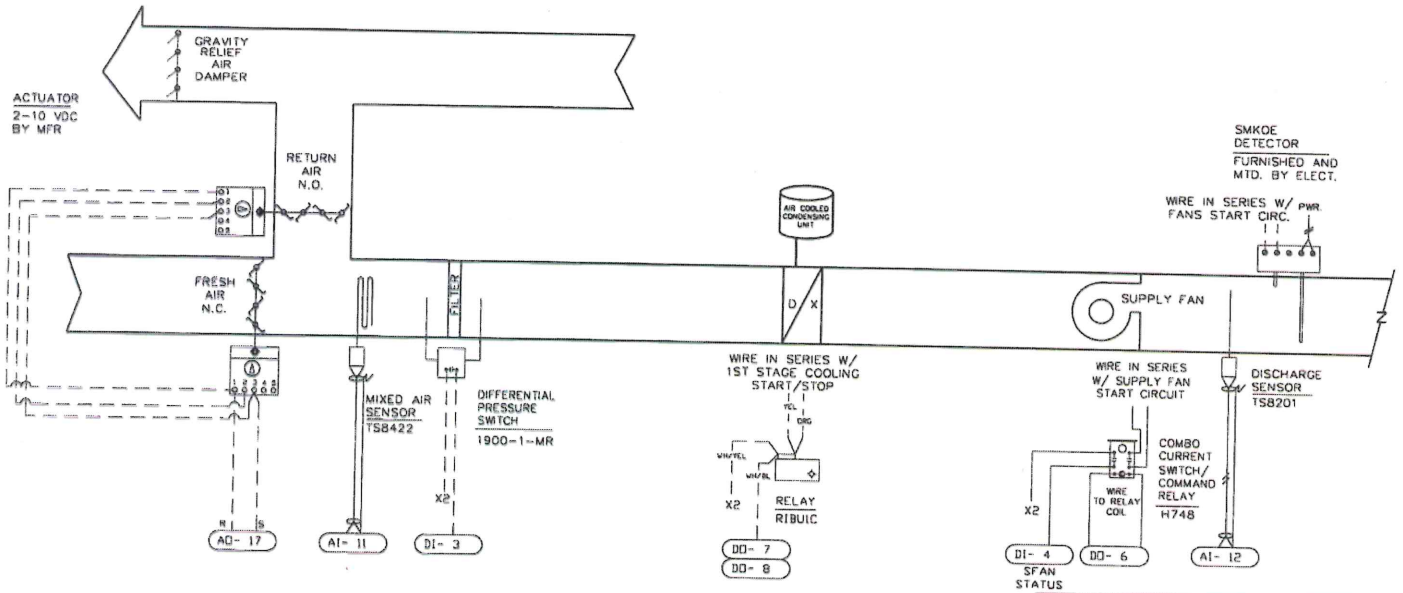


SEQUENCE OF OPERATION

WITH THE SUPPLY FAN MOTOR STARTER HAND/OFF/AUTO SWITCH IN THE "AUTO" POSITION, THE SUPPLY FAN WILL BE AUTOMATICALLY STARTED AND STOPPED BASED ON THE OPTIMUM START PROGRAM AND THE OCCUPANCY SCHEDULE AS PROGRAMMED THROUGH THE DIRECT DIGITAL CONTROL SYSTEM (DDC).

DURING THE UNOCCUPIED MODE, THE SUPPLY FAN WILL BE CYCLED "ON" AND "OFF" BY THE NIGHT CYCLE PROGRAM TO MAINTAIN SPACE TEMPERATURE ABOVE 60°F. (ADJ.)

IF THE SUPPLY FAN IS STARTED PRIOR TO THE OCCUPANCY HOUR BY THE OPTIMUM START PROGRAM OR DURING THE NIGHT CYCLE, THE OUTSIDE AIR DAMPER WILL REMAIN CLOSED. THE RETURN AIR DAMPER WILL BE FULLY OPEN.

WHEN THE SUPPLY FAN IS STARTED DURING THE OCCUPANCY PERIOD, THE OUTSIDE AIR DAMPERS WILL OPEN TO MINIMUM POSITION.

PROOF OF FLOW STATUS FOR THE SUPPLY FAN WILL BE PROVEN TO THE DDC SYSTEM BY MEANS OF THE FAN MOTOR CURRENT SWITCH.

THE DISCHARGE AIR TEMPERATURE SENSOR THROUGH DDC WILL MODULATE THE OUTSIDE AIR DAMPER AND THE RETURN AIR DAMPER TO MAINTAIN A DISCHARGE AIR TEMPERATURE SET POINT. THE DISCHARGE AIR TEMPERATURE SET POINT WILL BE 55°F. (ADJ.) WHENEVER THE OUTSIDE AIR TEMPERATURE IS 25°F. OR ABOVE AND THE DISCHARGE AIR TEMPERATURE SET POINT WILL BE 60°F. (ADJ.) WHENEVER THE OUTSIDE AIR TEMPERATURE IS 25°F. OR BELOW (ADJ.).

WHEN OUTSIDE AIR TEMPERATRUE IS GREATER THAN RETURN AIR TEMPERATURE, THE OUTSIDE AIR DAMPER WILL BE AT MINIMUM POSITION.

WHEN HOT WATER HEATING IS AVAILABLE, AS SENSED BY THE BOILER OPERATOR THROUGH THE DDC SYSTEM, THE ZONE SPACE TEMPERATURE SENSOR FURTHEST BELOW ITS SET POINT OF 75°F. (ADJ.) WILL CONTROL THE STAGES OF DIRECT EXPANSION (DX) COOLING TO MAINTAIN SPACE TEMPERATURE. WHEN HOT WATER HEATING IS NOT AVAILABLE, AS SENSED BY THE BOILER OPERATOR THROUGH THE DDC SYSTEM, THE AVERAGE ZONE SPACE TEMPERATURE WILL CONTROL THE STAGES OF THE DX COOLING TO PREVENT THE AVERAGE SPACE TEMPERATURE FROM EXCEEDING 75°F. (ADJ.).

THE ZONE SPACE TEMPERATURE SENSOR, THROUGH DDC, WILL MODULATE ITS RESPECTIVE HOT WATER TEMPERING COIL VALVE TO MAINTAIN SPACE TEMPERATURE SET POINT.

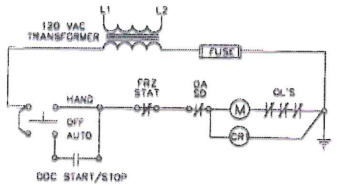
FILTER DIFFERENTIAL PRESSURE SWITCH WILL ISSUE A DIRTY FILTER ALARM IF ITS SET POINT IS REACHED.

IF SMOKE IS DETECTED IN THE AIR STREAM BY A SMOKE DETECTOR, THE SUPPLY FAN WILL BE DE-ENERGIZED.

IF THE SET POINT OF A FREEZESTAT IS REACHED, THE SUPPLY FAN WILL BE DE-ENERGIZED.

WHEN THE SUPPLY FAN IS DE-ENERGIZED, THE OUTSIDE AIR DAMPER WILL CLOSE AND THE RETURN AIR DAMPER WILL OPEN AND THE DX COOLING WILL BE DE-ENERGIZED.

SUPPLY FAN MOTOR STARTER WIRING



HW VALVE SCHEDULE							
UNIT	PART NO.	CONFIG.	SIZE	CV	GPM	WPD(V)	WPD(C)
HC-9	VS7211-201-4-03	2-WAY	1/2"	2.2	2.01	1.07"	1.08"
HC-10	VS7211-201-4-06	2-WAY	3/4"	7.5	3.30	.19"	.09"
HC-11	VS7211-201-4-08	2-WAY	1"	14	5.1	0.13"	.09"
HC-12	VS7211-201-4-03	2-WAY	1/2"	2.2	1.2	0.29"	.35"
HC-13	VS7211-201-4-03	3-WAY	1/2"	2.2	0.5	.05"	.04"

NOTE: CONTROL VALVE PRESSURE DROP WILL EQUAL 2.5 TIMES THE ASSOCIATED COIL WATER PRESSURE DROP. (MIN. 2.3' MAX. 15')

INCLUDE IN BASE BID

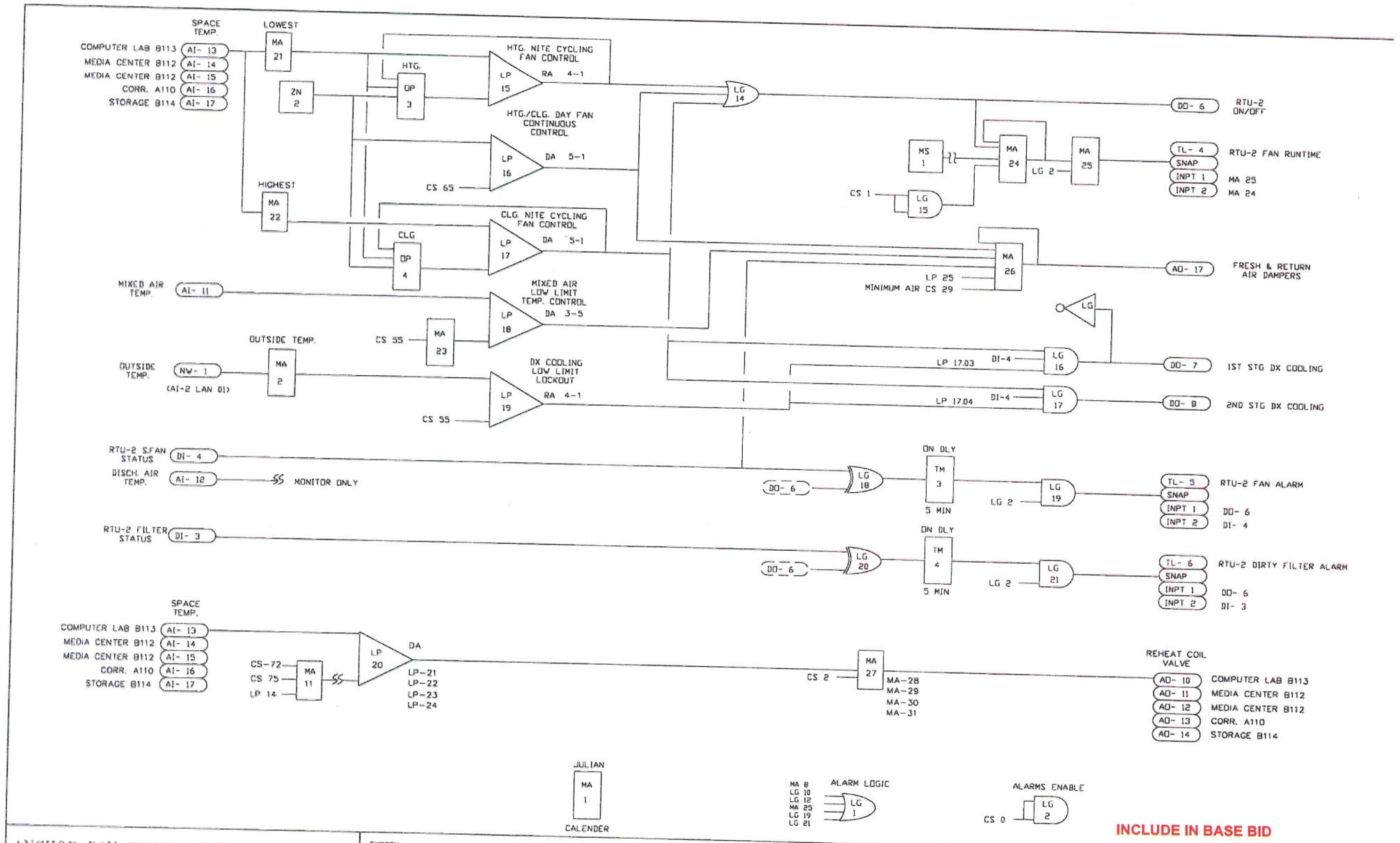
ANCHOR BAY SCHOOL DISTRICT
LOTTIE SCHMIDT ELEMENTARY SCHOOL
ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

SYSTEM:
ROOFTOP UNIT 2 CONTROL WIRING DIAGRAM
LAN ADDRESS 02

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE , WALLED LAKE MICH. 48390 TEL. (248) 669-0500

FILE NAME: RTU-2.dwg
ASBUILT BY: KDS DATE: 10-25-01 JOB NO. 00-146

07A
PAGE NUMBER



ANCHOR BAY SCHOOL DISTRICT

LOTTIE SCHMIDT ELEMENTARY SCHOOL

ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

SYSTEM:

ROOFTOP UNIT 2 CONTROL SOFTWARE DIAGRAM

LAN ADDRESS 02

LOCATED IN THE STORAGE ROOM A121

CTI CONTROLLED TEMPERATURE INC.

1897 BEST DRIVE , WALLED LAKE MICH. 48390 TEL. (248) 669-0500

FILE NAME: RTU-2 LOGIC.dwg

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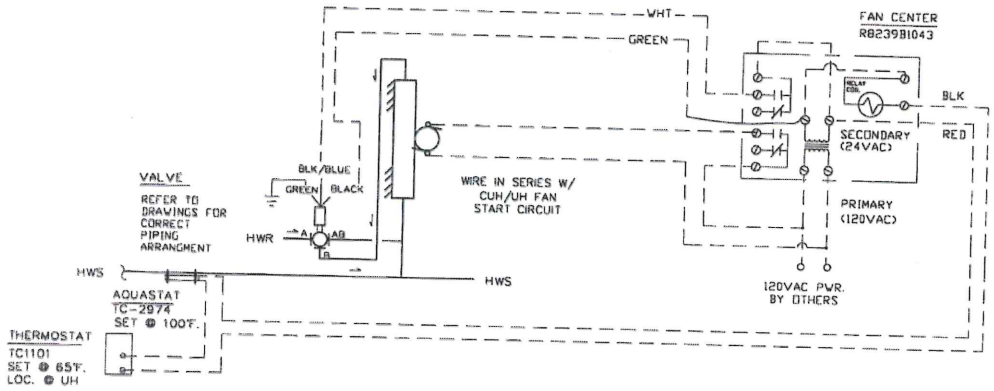
PAGE NUMBER

CABINET UNIT HEATER & UNIT HEATER CONTROL WIRING

(TYPICAL OF 4)



SEQUENCE OF OPERATION

UPON A CALL FOR HEAT FROM THE ROOM T-STAT, THE HWH COIL CONTROL VALVE WILL OPEN AND THE CABINET UNIT HEATER FAN WILL BE CYCLED ON. WHEN THE ROOM T-STAT SETPOINT IS REACHED. THE HWH COIL CONTROL VALVE WILL CLOSE AND THE CABINET UNIT HEATER FAN WILL BE CYCLED OFF.

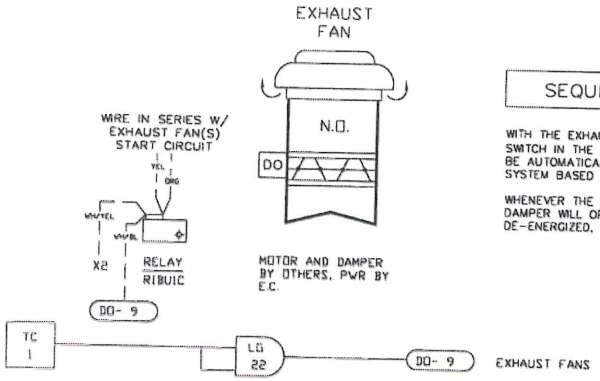
AQUASTAT WILL BE WIRED TO FAN TO PREVENT FAN OPERATION WHEN HEAT IS NOT AVAILABLE.

HW VALVE SCHEDULE							
UNIT	PART NO.	CONFIG.	SIZE	CV	GPM	WPD(V)	WPD(C)
UH-1	VA-7211-201-4-06	2-WAY	3/4"	7.5	2.9	0.15"	0.3'
UH-1	VA-7211-201-4-06	2-WAY	3/4"	7.5	2.9	0.15"	0.3'
CUH-2	VA-7313-201-4-02	3-WAY	1/2"	1.3	1.4	1.15"	2.77'
CUH-2	VA-7313-201-4-02	3-WAY	1/2"	1.3	1.4	1.15"	2.77'

NOTE: CONTROL VALVE PRESSURE DROP WILL EQUAL 2.5 TIMES THE ASSOCIATED COIL WATER PRESSURE DROP. (MIN. 2.3' MAX. 15')

EXHAUST FANS CONTROL WIRING

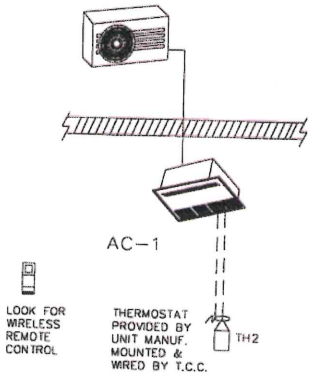
(TYPICAL OF 2)



SEQUENCE OF OPERATION

WITH THE EXHAUST FAN MOTOR STARTER HAND-OFF-AUTO SWITCH IN THE "AUTO" POSITION. THE EXHAUST FAN WILL BE AUTOMATICALLY STARTED AND STOPPED BY THE DDC SYSTEM BASED ON THE OCCUPANCY SCHEDULE.

WHENEVER THE EXHAUST FAN IS ENERGIZED, THE ISOLATION DAMPER WILL OPEN. WHEN THE EXHAUST FAN IS DE-ENERGIZED, THE ISOLATION DAMPER WILL CLOSE.



INCLUDE IN BASE BID

ANCHOR BAY SCHOOL DISTRICT
LOTTIE SCHMIDT ELEMENTARY SCHOOL
ADDRESS: 33700 HOOKER, NEW BALTIMORE, MI 48041

SYSTEM:
UH's & EXHAUST FAN(S) CONTROL WIRING
LAN ADDRESS 02

CTI CONTROLLED TEMPERATURE INC.
1897 BEST DRIVE , WALLED LAKE MICH. 48390 TEL. (248) 669-0500

FILE NAME: UH's & EXH FANS.dwg
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08
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