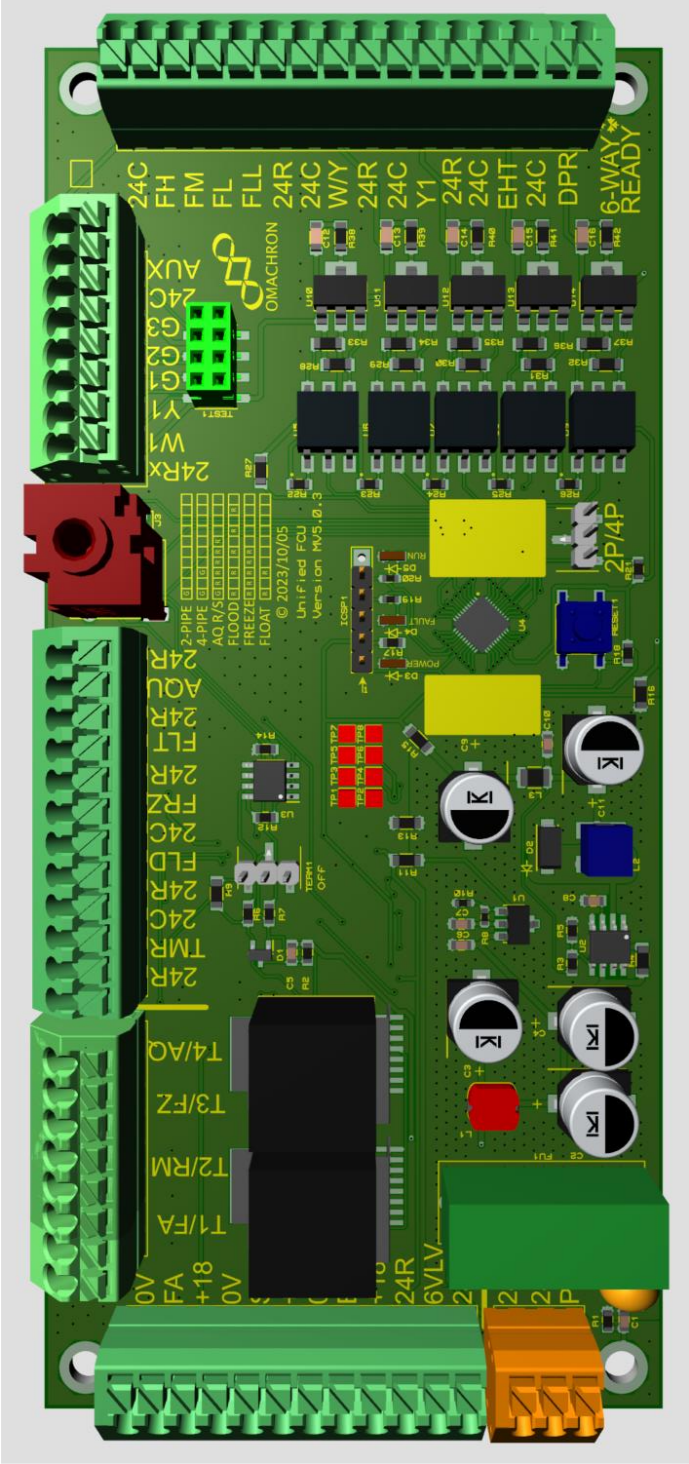
Fan Coil Controller Product Specifications



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1 Fan Coil Controller

1.1 Preamble

Omachron Fan Coil Control Board (FCCB) has been designed with cost and functionality in mind. Bringing a rich feature set, flexible programming options, field programable and compact size, the FCCB is well suited for most Fan Coil applications. The FCCB is a microprocessor-based Fan Coil Unit controller. It comes pre-programmed in one of four configurations and customized to meet the requirements of a variety of installations. All control boards are capable of operating a two-pipe FCU with a relay for auxiliary heat or a four-pipe system with separate valves for hot and cold-water supply. There are inputs for a flood sensor, drain pain float sensor, and freeze detection and protection. The Fan Coil Control Board can be operated from conventional thermostats with up to 7-wire control as well as serial communication using RS-485 protocol. ERV/HRV configurations can control fresh air and stale air ECM fans and integrate with contact based, bathroom timers that can provide or return a supplied 24VAC signal. The controller will operate a fresh air supply damper and offers frost and freeze protection for the heat exchanger.

1.2 Distinguishing Figures

Table 1 – Distinguishing Features

	FCU Only	FCU ERV/HRV
7 Wire Thermostat Conventional 24 VAC signaling	Support for operation of a single value for the hot/cold water supply	Control of two valves for hot and cold-water supply.
Commax Wall Pad RS485 Cabling using standard ethernet cables. Remote room temperature sensor	Aquastat input for detection of water supply temperature. Relay control for auxiliary heater.	Variable control of a six-way valve for water supply. Control of ERV/HRV functions.

The board has three LED indicators for troubleshooting basic faults and to identify proper operation. A 500-milliamp glass fuse is used for overcurrent protection.

2 Warnings

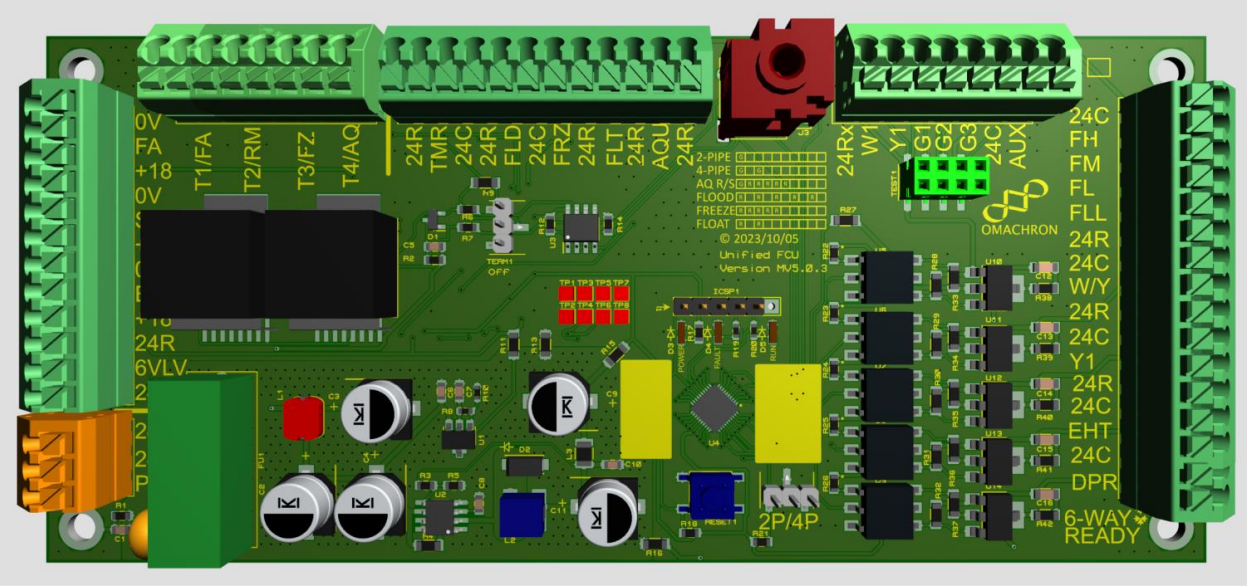
- Standard safety practices must be followed when operating a machine with rotating parts and potential pinch points.
- Since the Fan Coil Control Board (FCCB) can operate a motor or activate a relay that may operate other mechanical actuators, these warnings are particularly important.
- The FCCB should be protected from moisture.
- The FCCB circuitry must be protected from coming into contact with other conductive materials.
- The FCCB should only be operated indoors with appropriate ventilation.
- The FCCB controls moving and rotating parts and motors. Appropriate cautions and safeguards must be taken prior to servicing controlled equipment.
- The FCCB is not designed to operate medical devices.
- Improper use or installation may cause personal injury or death.
- No modifications can be made to this unit. Doing so will void the warranty.

3 Feature Matrix

Table 2 – Feature Matrix

		RS485 FCU+ HRV	RS485 FCU only	7-wire HRV+ FCU	7-wire FCU only
Controls	Conventional Parallel using 7 wire 24VAC			✓	✓
	RS-485 Serial (9600 baud)	✓	✓		
Digital Inputs	Flood	✓	✓	✓	✓
	Float	✓	✓	✓	✓
	Low Voltage Timer	✓		✓	
	Freeze	✓	✓	✓	✓
	Aquastat	✓	✓	✓	✓
	Auxiliary Input	✓	✓	✓	✓
Analog Inputs	Room Temperature 10k Thermistor	✓		✓	
	HRV Fresh Air Temp 10K Thermistor	✓		✓	
	Auxiliary Temperature Input 1 (Future Freeze)	✓		✓	
	Auxiliary Temperature Input 2 (Future Supply Temp)	✓		✓	
Digital Outputs	W/Y Valve	✓	✓	✓	✓
	Y Valve	✓	✓	✓	✓
	E-Heat	✓	✓	✓	✓
	Damper	✓		✓	
	Fan High	✓	✓	✓	✓
	Fan Medium	✓	✓	✓	✓
	Fan Low	✓	✓	✓	✓
	Fan Ultra-low	✓	✓	✓	✓
Analog Outputs	HRV Fresh-air Fan (0-10VDC)	✓		✓	
	HRV Stale-air Fan (0-10VDC)	✓		✓	
	ECM Motor Control (0-10VDC)	✓		✓	
	6-way Valve Control (0-10VDC)	✓		✓	

4 Physical Properties and Connections



4.1 Power Supply

Input power to the board is nominal 24VAC. A three-conductor connector provides for 24R, 24C and PE (protective earth or chassis ground). It is a 3.5mm connector and accepts 16-24AWG wire.

A 500-milliamp glass fuse is used for overcurrent protection of the circuit board and its outputs. Up to a two-ampere fuse may be substituted.

4.2 LEDs

The system has three LEDs to identify system operation and status.

- A green LED near the center is used as a power indicator.
- It simply indicates that the FCCB is connected to an acceptable power source. A green LED labelled Run indicates the board is properly operating.
- A single flash once per second indicates that the FCCB is operating in two-pipe mode.
- Two rapid flashes per second indicates that the FCCB is in four-pipe mode. A red LED labelled Fault identifies error conditions.
- Red LED rapid flash at 5Hz identifies the Flood signal has triggered.
- Red LED pulse flash identifies the Float signal has triggered.

- Red LED slow flash at 2Hz identifies the Freeze signal has triggered.
- Green Run LED flashing, Red LED Fault slow flash at 2Hz identifies that in a two-pipe system, the Aquastat has identified the supply water temperatures is incorrect.
- A solid red LED with a flashing green LED indicates that the Fan Coil operation is functioning but the thermistor for the HRV/ERV is not connected.

4.3 LED Summary

In the table below, G represents a flashing green LED and R a flashing red LED. The green power LED remains lit while power is supplied to the FCCB.

Table 3 - LED Status

2-PIPE	System mode (running normal)	**G**									
4-PIPE	System Mode (running normal)	**G**		**G**							
AQUASTAT	Aquastat in incorrect state for call	**G**	**R**	**R**	**R**	**R**	**R**				
FLOOD	Flood sensor is triggered (system shutdown)	**R**		**R**		**R**		**R**		**R**	
FREEZE	Temperature is below dry contact threshold	**R**	**R**	**R**	**R**	**R**					
FLOAT	Float sensor is tripped (system shutdown)	**R**		**R**							

4.4 Pipe Selection

At the bottom center of the board is a jumper to choose between 2-pipe and 4-pipe/6-way valve operation.
When the jumper is installed over the left two pins, the board operates in 2-pipe mode indicated by the slow green flash of the status LED.
When the jumper is removed or installed on the right two pins, the board operates in 4-pipe/6-way valve mode as indicated by the rapid green flash of the status LED.

4.5 Digital Outputs

There are three “sets” of digital output on one connector. It is a 3.5mm connector and accepts 16-26AWG wire.

4.5.1 Motor Control

The motor control output operates a three-tap or a four-tap motor.

- 24C is common for signaling.
- FH provides a 24VAC signal to select Fan High speed. RS232 wall pad boards will select FH when the setpoint to room temperature difference is 4°C or greater.
- FM provides a 24VAC signal to select Fan Medium speed. RS232 wall pad boards will select FM when the setpoint to room temperature difference is 2°C or greater but less than 4°C.
- FL provides a 24VAC signal to select Fan Low speed. RS232 wall pad boards will select FL when the setpoint to room temperature difference is 1°C or greater but less than 2°C.
- FLL provides a 24VAC signal to select Fan Low-Low speed. FLL is selected when no other fan speed is called. The FCCB can be configured to not output FLL when it would otherwise be called.
- 24R is a courtesy output for motors that require 24VAC for operation.

4.5.2 W/Y

The three connector W/Y digital output is used to control the hot valve (W) in a four-pipe system and the combined W/Y valve in a two-pipe system.

- 24C is common for the valve 24VAC power supply.
- W/Y is the signal for the valve operation. 0VAC is output when the valve
- should close. 24VAC is output to drive the valve to the open position.
- 24R is power (hot) for the valve 24VAC power supply.
- In a four-pipe system, W has priority over Y.

4.5.3 Y

The three connector Y digital output is used to control the cold valve (Y) in a four-pipe system or both valves in a two-pipe system when a second valve rather than a check valve is used.

- 24C is common for the valve 24VAC power supply or auxiliary heat relay.
- Y/A is the signal for the valve operation. 0VAC is output when the valve should close. 24VAC is output to drive the valve to the open position or to trigger the auxiliary heater relay.
- 24R is power (hot) for the valve 24VAC power supply.

4.5.4 Emergency Heat

The three connector EHT the auxiliary heater relay. DO NOT attempt to operate an auxiliary heater directly from this signal. This signal is energized with 24VAC when the system detects that the supply temperature is cold when it should be hot and there is a call for heat. The system will attempt to purge the supply for a set period of time and then continue with emergency heat only after a period of time, the FCCB will open the supply valve again to see if the supply has returned to a nominal temperature and if so, continue normal operation. The testing cycle will continue as long as there is a call for heat.

4.5.5 Damper

The HRV FCCB Damper connection provides 24VAC across L1 and L2 to keep a damper open. When 24VAC is removed, a spring driven damper can close. Power is provided to the damper continuously except during exception periods identified in the state table. Power is removed for approximately five minutes in each 24-hour period. Output is limited to less than one ampere.

4.6 Thermostat

This connector is used for standard 7-wire thermostats. It is a 3.5mm connector and accepts 16-26AWG wire. This smaller gauge lets contractors use less expensive and more flexible wire for thermostat connections. All inputs and the 24R output are 24VAC nominal.

- 24Rx is power (hot) for the valve 24VAC power supply to the thermostat. The x indicates that the 24R supply is controlled by the FCCB. If a Flood, Float, or Freeze condition is detected, the 24R supply is turned off.

- The output is limited to less than 500-milliamp.

- W1 is the incoming signal for heat. When active and no faults are detected, the FCCB will open and close valves accordingly and call for Auxiliary heat as necessary.

- Y1 is the incoming signal for cooling. When active and no faults are detected, the FCCB will open and close valves accordingly.

- G1, G2 and G3 are the three fan speeds that the thermostat can call. When no faults are detected, the FL, FM and FH outputs are selected respectively. If there is no input on any of these connections, the FLL output is activated if the FCCB is configured to do so.

- 24C is the common power connection.

4.7 Digital In

This connection is used for On/Off type input signals. It is a 3.5mm connector and accepts 16- 26AWG wire. This smaller gauge lets contractors use less expensive and more flexible wire for thermostat connections. All inputs are 24VAC nominal. When an end device requires power for operation, there is a 24C connection as well as the 24R connection.

- TMR, 24R and 24C: This connection is used to operate a 24VAC bathroom timer in FCCBs that contain HRV functionality. The Timer connections provide for a simple on/off signal returning the 24R to the TMR position. The board can also supply 24VAC to a smart device that returns the 24R on the TMR signal connection. This is a normally open circuit.

- FLD, 24R and 24C: This connection is used to operate a 24VAC flood sensor. The Flood connections provide for a simple on/off signal returning the 24R to the FLD position. The board can also supply 24VAC to a smart device that returns the 24R on the FLD signal connection. This is a normally closed circuit. When not used, a jumper should be placed between 24R and FLD.

- FLT and 24R: This connection is used with a 24VAC float switch. The Float connections provide for a simple on/off signal returning the 24R to the FLT position. This is a normally closed circuit. When not used, a jumper should be placed between 24R and FLT. A float condition can be corrected and the FCCB will resume operation. The is suitable for the situation where a drain pan is slow in emptying for some reason.

- FRZ and 24R: This connection is used with a 24VAC freeze detection switch to respond to conditions. An example is when the coil may freeze if a window or door is left open in winter. The Freeze connections provide for a simple on/off signal returning the 24R to the FRZ position. This is a normally open circuit.

- AQU and 24R are the incoming signal for determining is the supply is hot or cold in a two-pipe system. This connection is ignored in a four-pipe configuration. When closed, it indicates that the supply is cold. When open, it indicates that the supply is hot. If there is a call for heat when the supply is cold, the FCCB will keep the valve open for 10 minutes and operates the emergency heat. If the supply does not flush and becomes hot, the FCCB closes the supply valve and continues to operate the emergency heat for another 230 minutes for a complete four hour-cycle. If the supply becomes hot, the emergency heat use will be discontinued, and the supply valve opened.

4.8 RS-485

There are two RJ45 jacks when the RS-485 boards are used. This allows daisy-chaining multiple boards. The jack provides for RS485 signaling and supports the SmartONE/Commax wall pad communication protocol. The connection uses RS485 signaling at 9600 baud, 8 bits, N or No parity and 1 stop bit. The protocol is used by the SmartONE/Commax wall pad. The cable used is a standard ethernet cable CAT-5 or better connecting the wall pad to the control board. If the wall pad uses a higher category of cable, the same category should be used to connect to the FCCB. Using the second connector, up to three additional control boards can be connected in series to the wall pad to operate a total of four fan coil units. In applications where it is required, the terminator pins can be connected to terminate the RS485 signal chain. Termination is 120 ohms.

4.9 Thermistors

Thermistors must be 10K. The HRV FCCB can support four thermistors.

4.9.1 Fresh Air (FA)

The FA connection is used to sense the Fresh Air airstream temperature leaving the ERV/HRV. If the temperature is lower than the thaw temperature, the FCCB will place the HRV into a thaw cycle. During the thaw cycle, the damper will remain closed, the Fresh Air fan turned off and the Stale Air fan will run. This cycle is 90 minutes. If the temperature is lower than the defrost temperature but not as low as the thaw temperature, the same actions are performed for five minutes.

4.9.2 Room (RM)

The Room temperature thermistor is used with an RS485 wall panel. It is a remote temperature sensor mounted on a room wall as the wall pad does not have a temperature reference. The FCCB measures room temperature controls operating modes based on wall panel requests. Analogue Out

4.10 Variable Outputs

4.10.1 Fresh Air (FA)

The HRV FCCB can provide Electronically Commutated Motor (ECM) signaling for the Fresh Air or intake side of the ERV/HRV. 0 and 18 volts DC for motor control and a 0 to ten volt DC signal.

4.10.2 Stale Air (SA)

The HRV FCCB can provide ECM signaling for the Stale Air or exhaust side of the ERV/HRV. 0 and 18 volts DC for motor control and a 0 to ten volt DC signal.

4.10.3 Variable Speed Motor Control (ECM)

The HRV FCCB can provide ECM signaling for the main blower motor. 0 and 18 volts DC for motor control and a 0 to ten volt DC signal.

4.10.4 6-Way Valve (6VLV)

The HRV FCCB can control a six-way valve using three wires. The 24R and 24C provide operational power to the valve and the 6VLV connection provides 0 to 10 volts DC to position the valve. 2 volts is output for full cold, and 10 volts is output for full hot. Five volts position the valve to the closed position between cold and hot.

5 Wall Pad Operation

This section details operation of the RS485 versions of the FCCB that are used with a wall pad such as Commax wallpad that available from SmartONE. When multiple FCCBs are connected to one wall pad, the address of the additional boards is set through the diagnostic port.

5.1 Initial Start-up

When the FCCB is initially started and prior to any communication with the wall pad, the system operates as follows:

- Operating mode is General (not away mode)
- Ventilation mode is set to cool
- Away temperature is set to 20°C
- General temperature is set to 21°C
- Fan speed is set to low
- Once communication with the wall pad is established, these parameters will be transmitted to the wall pad and normal operation will continue.

5.2 Continued Operation

Once the wall pad begins operation, the FCCB responds to each data packet received that is specifically addressed to the FCCB. Broadcast requests are not acknowledged.

The data returned includes:

- Controller error status
- Setpoint for General mode
- Setpoint for Away mode
- Current sensor temperature
- Current Ventilation mode
- Current Fan speed.

When a packet is received that changes one of these parameters, it is saved in non-volatile memory should there be a power failure.

5.3 Power Failure Recover

In the event of a power failure the FCCB transmits the last known settings to the wall pad and operation continues in the same fashion as initial start-up.

5.4 Error Conditions

The FCCB monitors for and reports several error conditions.

5.4.1 Flood

A flood sensor is a device powered by the FCCB. A flood condition occurs when a flood sensor identifies liquid in the Fan Coil Unit. Depending on the FCU design, this may be a small or large amount of liquid. When a flood event occurs, the FCCB closes all the supply valves and if installed, turns off electric heat in a two-pipe system.
A flood event generates a “Severe Error” on the wall pad. A severe error may require intervention by a maintenance technician. Red LED rapid flash = Flood

5.4.2 Float

A float sensor is passive device that sends a yes/no status to the FCCB. A float condition occurs when the float sensor identifies liquid at a pre-determined level in the Fan Coil Unit, normally in a drain pan. Depending on the FCU design, this may be a small or large amount of liquid. When the float event occurs, the FCCB closes all the supply valves and if installed, turns off electric heat in a two-pipe system. Should the drain pan level lower, and the float sensor return to a normal level, the Float condition will release, and normal operation will continue. A flood event generates a “Severe Error” on the wall pad. A severe error may require intervention by a maintenance technician. Red LED pulse flash = Float

5.4.3 Freeze

A freeze sensor is passive device that sends a yes/no status to the FCCB. A freeze condition occurs when the freeze sensor identifies that the operating temperature inside the Fan Coil Unit had dropped to a predetermined temperature. When the freeze event occurs, the FCCB modifies operation to protect the Fan Coil Unit from freezing. If the unit recovers from the freeze event, normal operation will continue. A freeze event generates a “Moderate Error” on the wall pad. Red LED slow flash = Freeze

6 Diagnostics and Configuration

The FCCB can display all the current operating parameters through the diagnostic port. Commands are started with a semi-colon (;) followed by a two-character option. When a value can be specified for an option, the value is delimited by an equal sign (=). Use the return key or enter key to submit the request to the FCCB.

6.1 Command Set

Table 4

ST	STatus	Show the Current Operating Status
RS	**R**e**S**et to Factory Defaults	
SV	**Sa**a**V**e changes	
AD=x	**AD**dress for modbus/SmartONE	1
MM=x	**M**odbus **M**ode	1=ASCII, 2=RTU
SP=x	**M**odbus S**P**eed	x=the speed code
LK=x	**L**ock with x	
UL=x	**U**n**L**ock with code x	153
TC=xx	**T**hermistor Curve	0=10, 1=47
VC=x	**V**alve **C**ount	0=2, 2=2, 1=4, 4=4
AW=x	**A**quastat **W**ait	240
AF=x	**A**quastat **F**lush	10
AT=x	**A**quastat **T**ype	1=open is hot 0=open is cold
FT=x	**F**loat **T**ype NC = Dry	0 for normally open, 1 for normally closed
ZT=x	free**Z**e **T**ype NO = Hot	0 for normally open, 1 for normally closed
LT=x	f**L**ood **T**ype NC = Dry	0 for normally open, 1 for normally closed
FH=xxx	**F**resh air fan **H**igh speed	70
FL=xxx	**F**resh air fan **L**ow speed	15
FD=xxx	**F**resh air fan **D**efrost speed	0
SH=xxx	Stale air fan **H**igh speed	75
SL=xxx	Stale air fan **L**ow speed	20
SD=xxx	Stale air fan **D**efrost speed	75
CT=xxx	**C**ycle **T**ime for the damper	1440 In minutes.
RT=xxx	**R**est **T**ime for the damper	5 In minutes.
DM=xx	**D**efrost **M**inutes	5
DT=xx	**D**efrost at **T**emperature	12
TM=xx	**T**haw **M**inutes	90
TT=xx	**T**haw at **T**emperature	0
EH=xxx	**E**CM **H**igh speed	100
EM=xxx	**E**CM **M**edium speed	70
EL=xxx	**E**CM **L**ow speed	40
XH=x	**X**-over Temp from SP for **H**igh	20
XM=x	**X**-over Temp from SP for **M**edium	4
XL=x	**X**-over Temp from SP for **L**ow	1

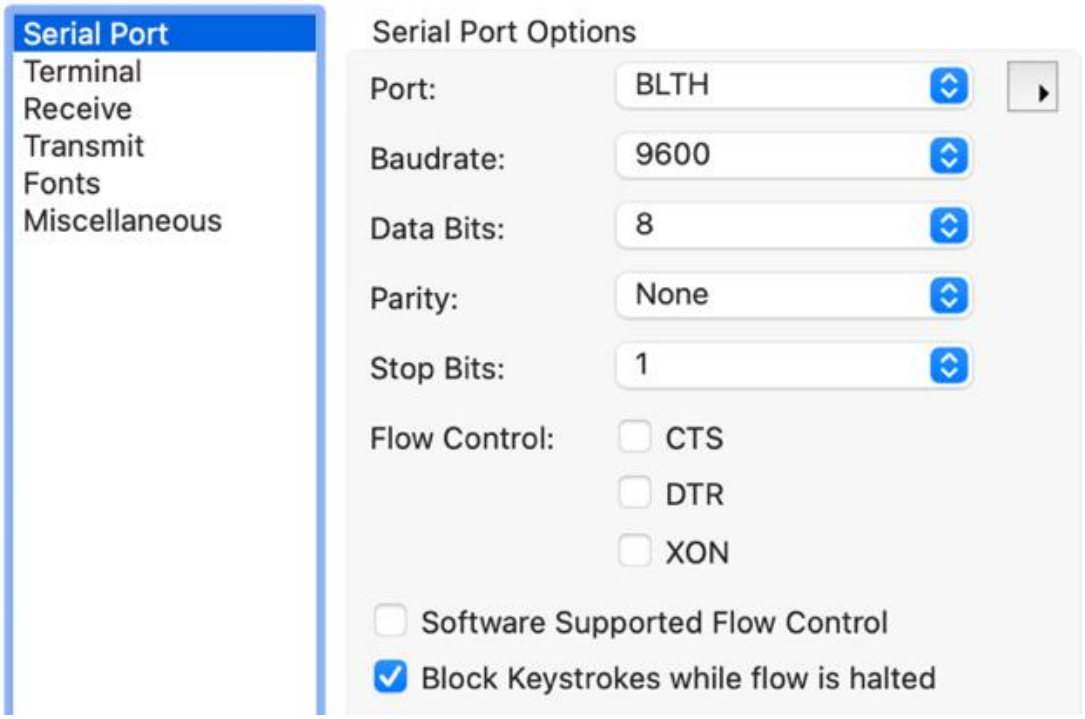
6.2 Communication Program

The CoolTerm program is universally available and has been found to work well and is available for all computer platforms. It is available from Roger Meier's Freeware site at https://freeware.the-meiers.org/

6.2.1 CoolTerm Options

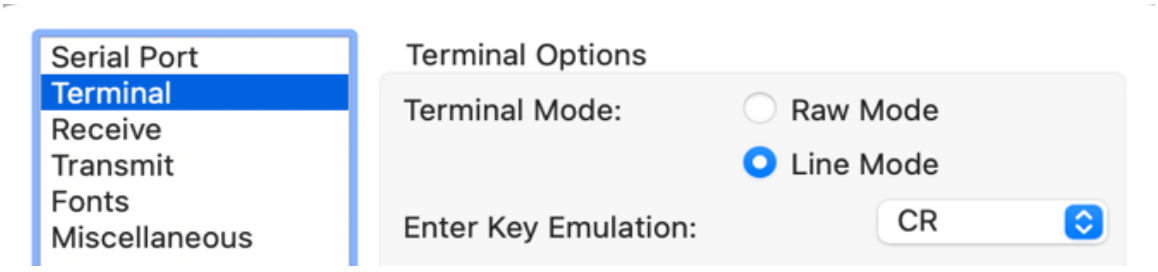
Set the serial port as show. Select the port for your device.

Figure 2 – Serial Port Settings



For RS485 devices, set the Terminal Mode as shown for Line Mode.

Figure 3 – Terminal Mode Settings



With an RS485 device, the wall pad or other device must not be connected or turned off. Your setup computer must be the only device connected.
For 7-wire devices, use Raw Mode.

7 State Charts

INPUTS																	
SENSORS				THERMOSTAT				CONFIG		PROCESS	FCU OUTPUTS						
FLOOD	FLOAT	FREEZE	AQ	CALL HEAT	CALL COOL	AUX	FAN	PIPES	AQ TIME	AQ TIME	TS PWR	VALVE 1	VALVE 2	E HEAT	ULTRA LOWS	FAN	EMC
YES	NO	N/A	N/A					N/A	N/A	STOP	OFF	CLOSED	CLOSED	OFF	OFF	OFF	OFF
YES	YES	N/A	N/A					N/A	N/A	STOP	OFF	CLOSED	CLOSED	OFF	OFF	OFF	OFF
YES	YES	YES	N/A					4	N/A	STOP	OFF	OPEN	CLOSED	OFF	OFF	OFF	OFF
YES	N/A	YES	N/A					2	N/A	STOP	OFF	OPEN	OPEN	OFF	OFF	OFF	OFF
			N/A	YES	YES			4	N/A	0	ON	OPEN	CLOSED	OFF			
			YES	YES	YES			2	N/A	0	ON	OPEN	OPEN	OFF			
			YES	YES	YES			2	<=10	RUN	ON	OPEN	OPEN	ON			
			YES	YES	YES			2	<=240	RUN	ON	CLOSED	CLOSED	ON			
			YES	YES	YES			2	>240	0 AND RUN	ON	OPEN	OPEN	ON			
			YES	YES	YES			4	N/A	N/A	ON	OPEN	OPEN	OFF			
			YES	YES	YES			2	N/A	N/A	ON	OPEN	OPEN	OFF			
			YES	YES	YES			2			ON	CLOSED	CLOSED	OFF			
			YES	YES	YES			2			ON	CLOSED	CLOSED	OFF			
			YES	YES	YES			2			ON	CLOSED	CLOSED	OFF			
			YES	YES	YES			2			ON	CLOSED	CLOSED	OFF			
						N/A	L,M, H	4							OFF	L,M, H	L,M, H
						OFF	OFF								ON	OFF	10%
				.		ON	OFF								OFF	OFF	0%

Table 6 – ERV/HRV Outputs

INPUTS								
SENSORS			BR	TS	PROCESS			
Flood	Float	Freeze	FA Temps	Timer	HRV	Rest	Timer	Time
Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A
			<= Thaw	Off	N/A	Delay	Run	90
			<= Thaw	On	N/A	Delay	Run	90
			<= Def	Off	N/A	Delay	Run	5
			<= Def	On	N/A	Delay	Run	5
			<= Def	Off	Off	Allow	Run	1440
			<= Def	Off	Off	Req'd	Run	5
			<= Def	Off	On	Allow	Run	0
			<= Def	Off	On	Reqst'd	Run	1440
			<= Def	Off	Off	Reqst'd	Delay	5
			<= Def	On	On	Reqst'd	Delay	0 and run

HRV Outputs			
TS PWR	FA Fan	SA Fan	Damper
Off	Off	Off	Closed
Off	Off	Off	Closed
Off	Off	Off	Closed
On	Defrost	Defrost	Closed
On	Defrost	Highest	Closed
On	Defrost	Defrost	Closed
On	Defrost	Highest	Closed
	Low	Low	Open
On	Off	Off	Closed
On	Off	Off	Closed
On	Off	Off	Closed
On	High	High	Open
On	High	High	Open

Table 7 – ECM Fan Speeds

	FA	SA	ECM
Ultra			10
Low	15	20	10
Medium			50
High	70	75	90
Defrost	0	75	

8 Electrical Specifications

8.1 Power

	Minimum	Nominal	Maximum	Units
Voltage	20	24	25	V_{RMS}
Current	18	25	35	VA
Fusing	500	-	625	mA

8.2 Digital Input

	Minimum	Nominal	Maximum	Units
Voltage	20	24	30	V_{RMS}
Current	2	2.2	3	mA @24 VA

8.3 Analog Input

	R@25	Beta - 10~25	Beta 25~50	Beta 50~75
T1/FA				
T2/RM				
T3/FZ				
T4/AQ				

8.4 Digital Output

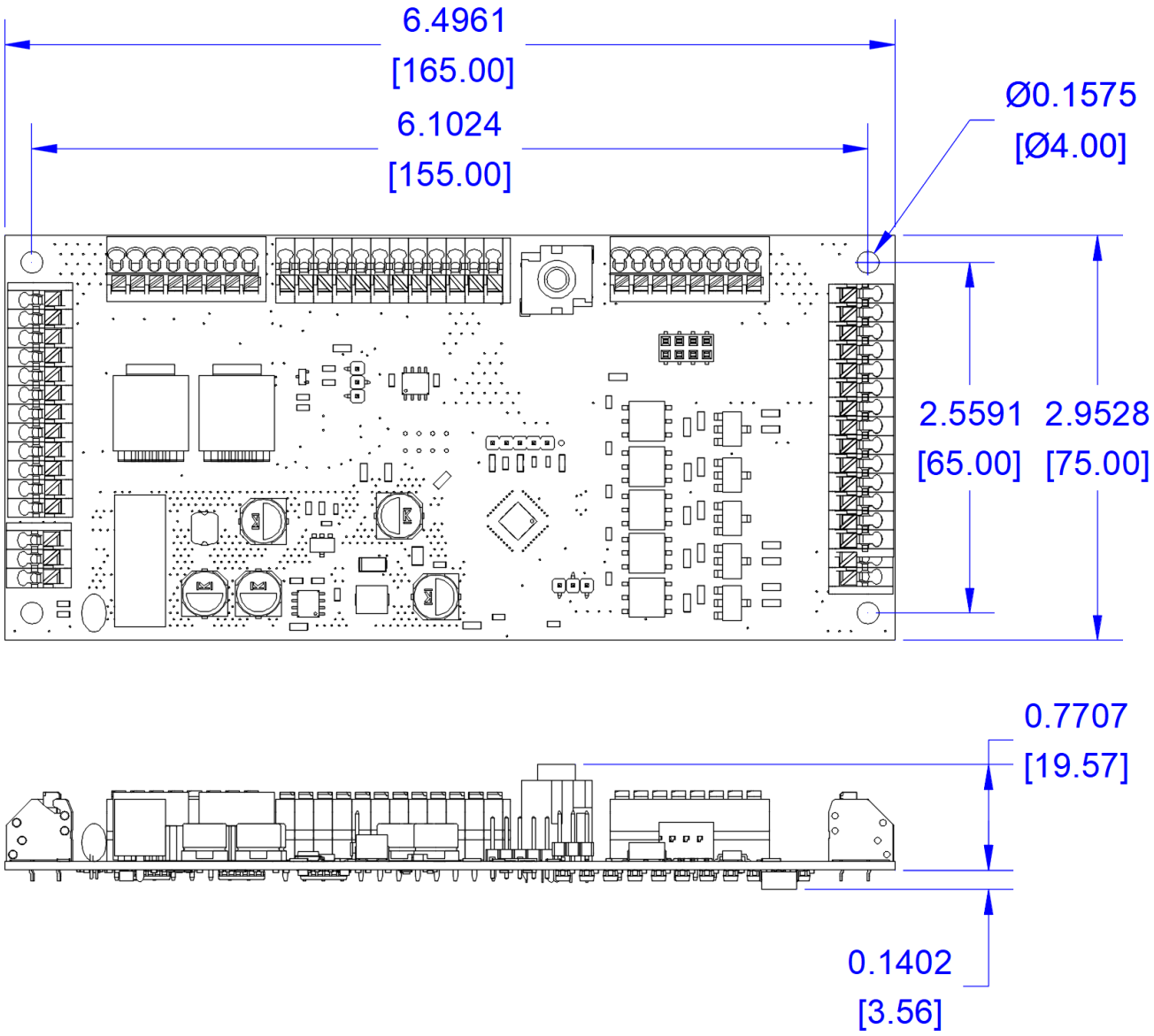
	Low	Low (loaded)	High	Units
Voltage Low Current	20	24	25	V_{RMS}
Voltage High Current	2	2.2	3	V_{RMS}
Voltage Snubber				V_{RMS}
High Current				mA
Low Current				mA

8.5 Analog Output

	Low	Low (loaded)	High	Units
Voltage Low Current	20	24	25	V_{RMS}
Voltage High Current				V_{RMS}
Voltage Snubber				V_{RMS}
High Current				mA
Low Current				mA

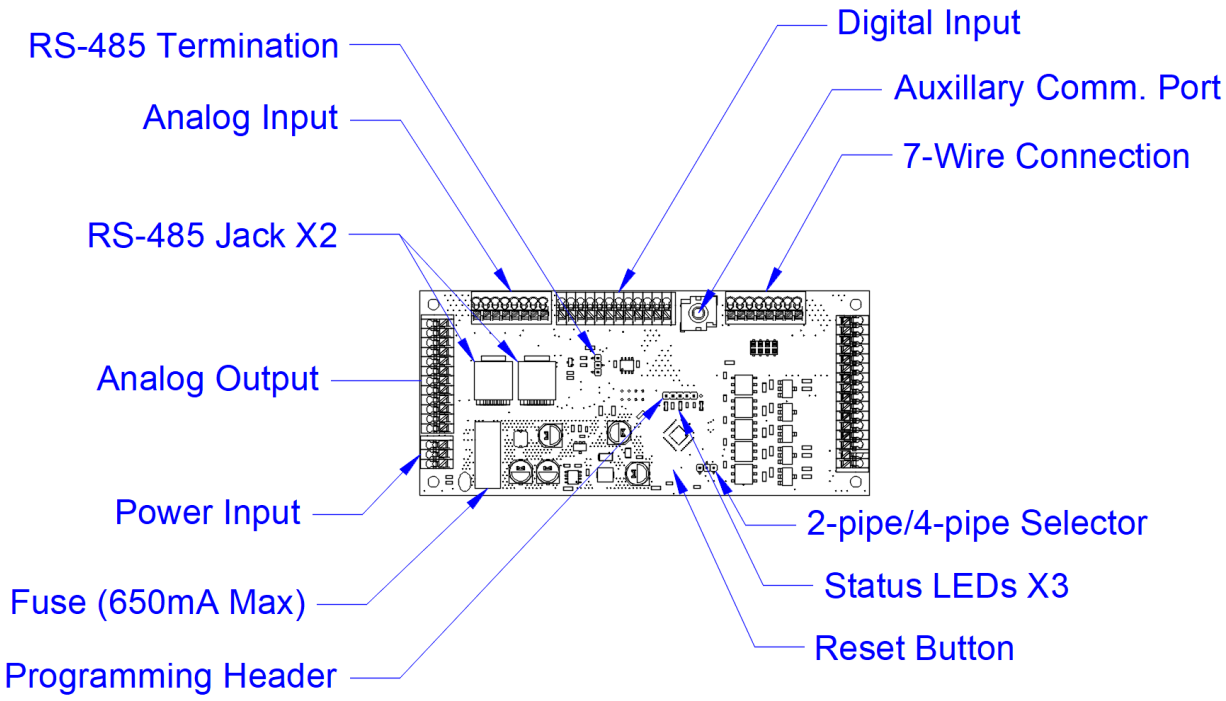
9 Mechanical Specifications

9.1 Size and Mounting



Size	6.496”	165mm	2.953	75	0.911”	23mm
Clearance	X/Y	1”	25mm	Z	0.250”	6mm
Mounting	6.102	155mm	2.559”	65mm	.156	4mm
Strain			Torque			

9.2 Hookup diagram



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