



# S2UI28-N2S

Wall-Mount User Interface Terminal

JCI N2 Bus Slave Version

## Introduction

The S2UI28-N2S is a wall-mount User Interface terminal that provides information and interaction between the User and a JCI N2 Bus Building Management System (BMS).

## Hardware Features

The S2UI28 has the following Hardware functionality:

Size: 3.563" Wide x 5.783 Length x 1.197" Thick (the PIR lens protrudes 0.3" above surface)

Power Supply 13 to 24V AC/DC

- With replaceable Mini (Nano) Fuse

One (1) 2.8" TFT LCD Display with LED backlight and Touch Screen

- Resolution of 240 x 320 Pixels, 262K colors

- Viewable/Usable Area of 1.75" W x 2.25" H

- Controllable LED Backlight (On, Off, Timed Off, Auto Turn-On)

One (1) RS-485 Electrically Isolated

- Interface has over-voltage protection and internal auto reset-able thermal fuses in the event of high voltages present on the RS485 / N2 bus

One (1) 10/100 Ethernet Interface with RJ-45 Connector

- Functionality to be determined

One (1) USB Interface for Configuration

- USB Mini-B Receptacle

Two (1) Binary Inputs (12 to 24V AC/DC Compatible)

- For external Sensors, etc

Two (2) Temperature Sensors

- One (1) Platinum 1K ohm for direct connect to external JCI controllers (i.e. VMA, UNT, etc)

- Range: -40C to +105, however, we will spec this to be 0C to +40C

- One (1) on-board temperature sensor (+/- 1 deg accuracy) read as a AI

- Range: 10C to +50

One (1) Ambient Light Level Sensor

- One (1) AI Point with units of lux. Range: 0 to 3000 lux

- One (1) AI Point with units of foot-candles, Range: 0 to 280 foot-candles

One (1) Occupancy / Passive Infrared (PIR) Sensor

One (1) Audio Output Transducer with variable frequency and volume

One (1) Micro-SD Card Interface for customized files, Trending/Logging, etc

Protocol Support: JCI N2 open, BACNet MS/TP, HTTP

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**Current Functionality:**

## a. Mapped as VND Device

## b. Fifteen (15) Analog Outputs (firmware)

These AOs (AO1 to AO15) correspond to the "Data Fields" as seen on the S2UI28 display. These are not physical AOs in the sense that a real analog voltage is not generated or available.

Each of these S2UI28 AOs can be configured with the following features:

Color (currently 8 is available, however, we can add additional ones as we have 262000 colors available)

Decimal Places (0 to 3)

Units Field (Max 3 characters)

User Editable/lock-out with Min, Max, and Increment fields

Display Data as an one of four enumerated strings (i.e. display Heating, Cooling, etc)

Each string can have a different color

AO can be disabled so that it does not appear on the screen

Each AO has a corresponding "Tagname" field that is a Human Readable label of what the data is (i.e. Room Temp, etc).

TagNames have a maximum number of 19 characters

## c. Twenty (20) Analog Inputs

AI-1 to AI-15 correspond to the Data Field AOs for use in reading in the User's desired value

AI-16 Ambient Light level in Lux

AI-17 Ambient Light level in Foot-Candles

AI-18 On-Board Temp in C

AI-19 On-Board Temp in F

AI-20 PIR Counts per time period

## d. Four (4) Binary Inputs

BI-1 and BI-2 are physical Inputs, 12-24 V AC/DC Input

BI-3 PIR Detect (Raw, no filtering)

BI-4 PIR Filtered (this BI only gets asserted if the number of PIR Counts exceeds its threshold)

## e. One (1) ADI (Internal Integer)

ADI-1 PIR Threshold Count

## f. Programmable N2 Address

## g. LCD Auto Off time from 0 (always on) to 240 seconds

The LCD has a LED Backlight which has a lifespan of approximately 100K hours.

Here the display will automatically turn off at the designated time. This is desirable, as the TFT LCD can become warm if left on indefinitely (similar to your cell phone when you use it a lot).

## h. LCD Auto on - The LCD can be programmed to come alive if the PIR is active

## i. Ethernet Connectivity

Static or Dynamic (DHCP) IP is supported.

Complete Functionality has not been determined. Functionality could include a a mini-webserver (currently being tested), streaming data to a software client, or SMS/Text messages to Cellphones, etc.

## j. System Integrator (SI) Information Screen

This screen allows the System Integrator to add their company name and telephone number into the device.

## k. Diagnostic screen

- N2 address (Green when communicating with Supervisory or Red if not)

- Ambient Light levels in lux and Foot-Candles

- BI-Statuses (High or Low)

- PIR Raw Value (Detect or 0)

Can be placed in PIR test mode by touching the value. Here each time the PIR detects movement a Beep is heard. This is useful to detect the PIR's range

- PIR Count - How many PIR detects per time period

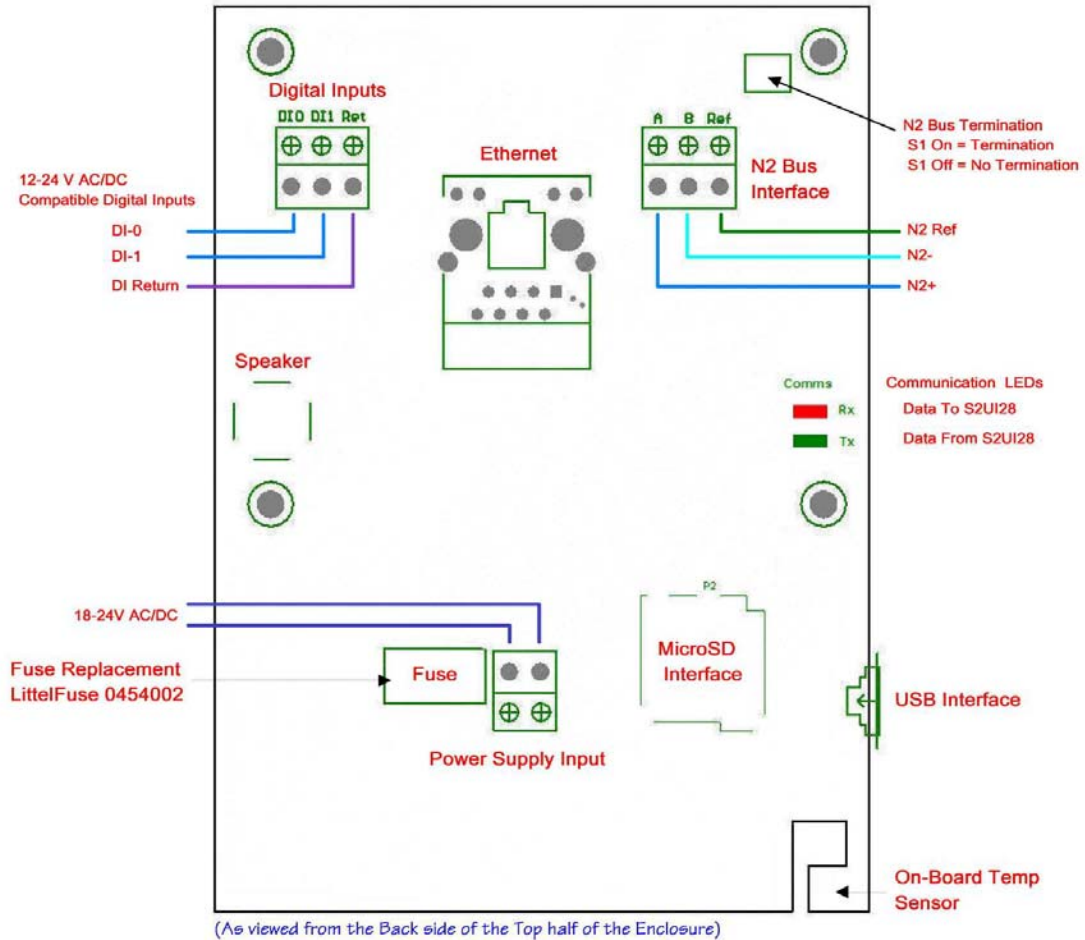
- On-board Temperature in Celcius

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## S2UI28-N2S Panel Point Map

Point Type	Address	Units	Description	Range/Value
BI	1	Open/Closed	On-Board Binary Input	
BI	2	Open/Closed	On-Board Binary Input	
BI	3	Detect/None	PIR Raw Detect Pulse	
BI	4	Detect/None	PIR Filtered Pulse	
AI	1		Data Field User Input Value	
AI	2		Data Field User Input Value	
AI	3		Data Field User Input Value	
AI	4		Data Field User Input Value	
AI	5		Data Field User Input Value	
AI	6		Data Field User Input Value	
AI	7		Data Field User Input Value	
AI	8		Data Field User Input Value	
AI	9		Data Field User Input Value	
AI	10		Data Field User Input Value	
AI	11		Data Field User Input Value	
AI	12		Data Field User Input Value	
AI	13		Data Field User Input Value	
AI	14		Data Field User Input Value	
AI	15		Data Field User Input Value	
AI	16	Lux	Amibient Light Level	
AI	17	Foot-Candles	Ambient Light Level	
AI	18	C	On-Board Temperature Sensor	
AI	19	F	On-Board Temperature Sensor	
AI	20	Count	PIR Counts Per time Period	
AO	1		Data Field 1	Screen 1 1 <sup>st</sup> Item
AO	2		Data Field 2	Screen 1 2 <sup>nd</sup> Item
AO	3		Data Field 3	Screen 1 3 <sup>rd</sup> Item
AO	4		Data Field 4	Screen 2 1 <sup>st</sup> Item
AO	5		Data Field 5	Screen 2 2 <sup>nd</sup> Item
AO	6		Data Field 6	Screen 2 3 <sup>rd</sup> Item
AO	7		Data Field 7	Screen 3 1 <sup>st</sup> Item
AO	8		Data Field 8	Screen 3 2 <sup>nd</sup> Item
AO	9		Data Field 9	Screen 3 3 <sup>rd</sup> Item
AO	10		Data Field 10	Screen 4 1 <sup>st</sup> Item
AO	11		Data Field 11	Screen 4 2 <sup>nd</sup> Item
AO	12		Data Field 12	Screen 4 3 <sup>rd</sup> Item
AO	13		Data Field 13	Screen 5 1 <sup>st</sup> Item
AO	14		Data Field 14	Screen 5 2 <sup>nd</sup> Item
AO	15		Data Field 15	Screen 5 3 <sup>rd</sup> Item
ADI	1	Count	PIR Threshold Count	PIR Filtering Value for BI-4

# S2UI28-N2S Wiring Diagram Rev 1.0 - 2010-02-01



**Off-Board Temperature Sensor**  
JCI Platinum 1K Compatible



(As viewed from the Top side of the Bottom half of the Enclosure)

## Occupancy / PIR Sensor Data Point Clarification

The PIR (Passive InfraRed) / Occupancy Sensor circuitry on the S2UI28 has some pre-built filtering (i.e. resistors, capacitors, op-amp, etc) that minimizes false triggering. However, on-board filtering can only do so much and if you make the filters too restrictive, then the "trigger time" extends out ... i.e. the person may need to walk around for 10's of seconds for a trigger to occur. Consequently, I use a combination of an analog filter (i.e. the on-board electronic components) and a digital filter (the points that I expose). Thus, the system integrator can adjust the digital filter values (points) to increase or decrease the sensitivity of the Sensor. No one out there does this and I think that it is important, as there are times where you need to adjust some data to optimize the Sensor's functionality for a given area. So, your items 2 through 4 are representative of the digital filter portion and your item 1 is the unfiltered (digital) output of the Sensor.

So, to recap ( remember that a Supervisory "Input" is actually an "Output" to the S2UI28 and so you may see an "Output" statement in my following descriptions)

### BI 3 - PIR Unfiltered (Digital) Output

This point is the status level of the Sensor without any digital filtering

### BI 4 - PIR Filtered - Digitally filtered Output

This point is the value of the Sensor output digitally filtered. This point is used in conjunction with ADI 1 (PIR Threshold Count).

### ADI 1 - PIR Threshold Count

This point is the value at which BI-4 ( PIR Filtered Output) becomes asserted (i.e. goes from a Low to a High, or a Trigger Pulse).

The Logic for the PIR Filtered Output is as follows:

The number of PIR Unfiltered pulses are counted and once the PIR Threshold Count (ADI - 1) is reached, then the PIR Filtered Output (BI-4) is asserted.

The maximum overall rate at which BI-3 or BI-4 can be asserted is dictated by the electronic circuitry on the S2UI28 and is approximately 2.7 seconds (hard coded analog filtering).

### AI 20 - PIR Counts per time period

This value reflects the number of PIR pulses (triggers) that occur for a fixed time period of 30 seconds. Right now, I have hard coded the 30 second timer, but will create a point (ADI, etc) that will allow the user to change this time period. However, 30 seconds seemed reasonable for my initial release. This value is the same value that is used with ADI-1 to determine when it is to be asserted. I may change this so that ADI-1 is unrelated to AI-20 in a future release in order to improve operation, as I did this rather quickly.

The nice thing about this point is that it will not update for at least 30 seconds which minimizes the bandwidth on the bus.