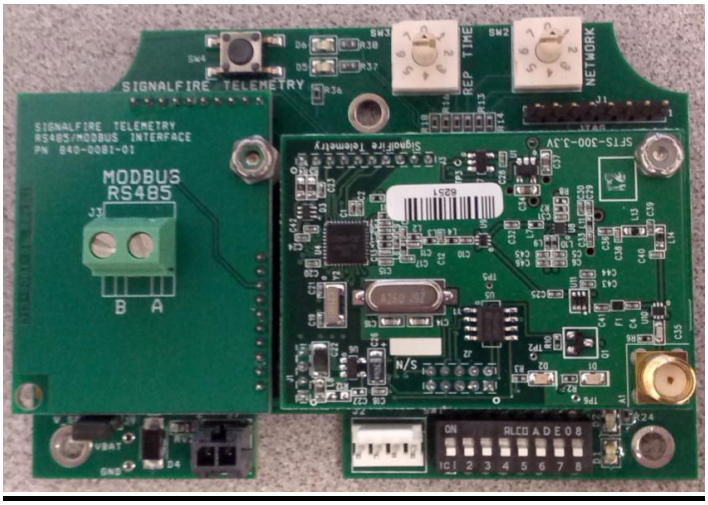
SFRSS-A2-485 Remote Sensor Module Instruction Sheet

The SignalFire A2-485 sensor interface module has the following features:

- Settable (rotary switch) check-in period
- Settable (rotary switch) network address
- RS-485 Modbus interface. Acts as a Modbus master and polls a pre-configured register set from attached Modbus sensor(s) on a schedule and reports the data to the gateway.
- Low power operation from a 3 “D” cell lithium battery pack (external power from 3.5 to 5.0VDC may be used in place of the battery)
- Sends data to a SignalFire Buffered Modbus Gateway



Operating Mode

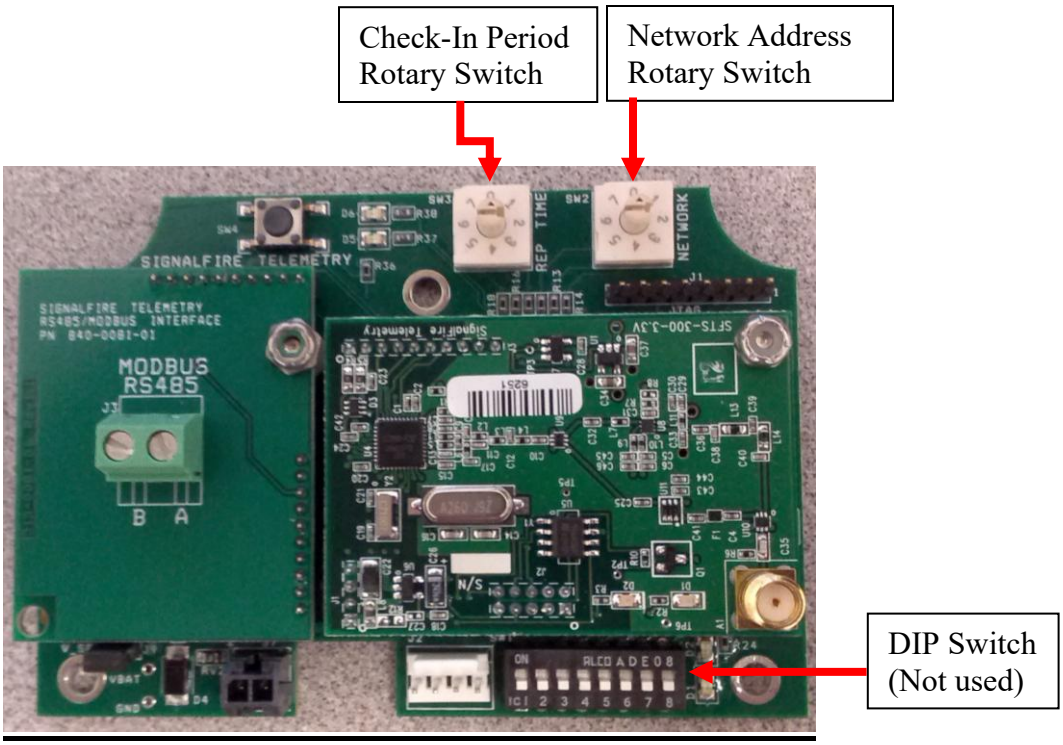
This A2-485 requires that the node is pre-configured with the register map to poll using the SFToolKit PC application at the time of installation.

The pre-configured set of registers is automatically read from the Modbus sensor device and forwarded to the Modbus gateway on a pre-defined schedule (1 minute to 5 minutes is typical). The register data is then buffered in the gateway and is available to be read by the RTU at any time.

Setup

The nodes need to be set up for correct operation before being fielded. The configurable items are:

- Network Selection
- Check-in Period Selection



Network Setting

The network address can be used to create multiple networks using multiple gateways (that are in close proximity with one another). The network address can be selected using rotary switch SW2 in the lower right corner of the board.

The network setting must be the same on all units in the network including the gateway.

System Check-In Period

The check-in period is set using rotary switch SW1 in the upper right corner of the board. The switch settings are a shown in the following table:

Switch Setting	Check-In Period
0	1 min
1	2 min
2	4.5 min
3	10 min
4	30 min
5	1 hr
6	5 sec
7	15 sec

The default setting is 2 for a check-in period of 4.5 minutes.

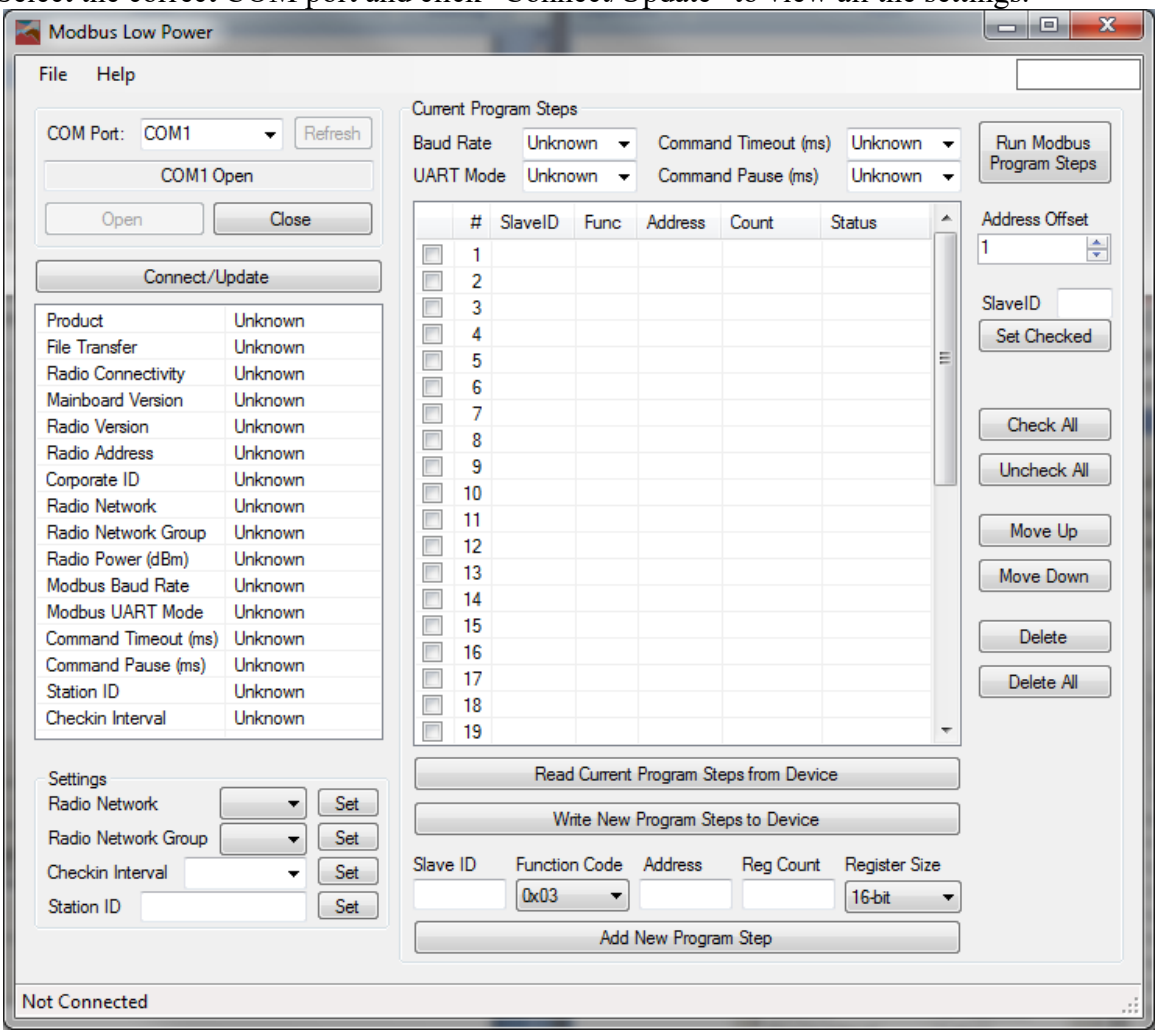
Note: Settings 6 and 7 should only be used for testing or a non-battery pack powered node as they will have a high power draw.

Modbus Sensor Connection

Connect the "A" and "B" RS485 terminals from the A2-485 to the Modbus sensor(s)

Configuration

To begin configuration, open SFToolkit, and select “Modbus Low Power”. Alternatively, you can choose Auto-Detect on the COM port that the A2-485 node is connected to. The configuration window below will open up. Select the correct COM port and click “Connect/Update” to view all the settings.



Modbus Program Steps Configuration

If using *pre-configured register set mode*, the register set to poll on each check-in must be defined using program steps. A program step consists of one of the following modbus opcodes:

0x01 MODBUS_READ_COILS (limit: 1 coil)
0x03 MODBUS_READ_HOLDING_REGISTERS

0x04 MODBUS_READ_INPUT_REGISTERS
0x05 MODBUS_WRITE_SINGLE_COIL

Up to 34 program steps can be programmed. Any response from a Modbus device (data or exception) will be forwarded to the Modbus Gateway and cached. Use the "Read Current Program Steps from Device" to view the current program steps in the table. They can then be deleted or re-ordered using the buttons to the right of the table. To add a new program step, fill in the 5 boxes at the bottom, and click "Add New Program Step". If the step is valid, it will be added to the table. Finally, click "Write New Program Steps to Device" to save the changes.

Note that the register address entered is subtracted by the Address Offset field to the right of the table. Typically, the offset is 1.

It is important to make sure that, in a given network, there are no duplicate Slave IDs. The gateway will only cache one set of data for each Slave ID, so the duplicate will be overwritten.

For more information on issuing modbus commands and their formats, please see the Modbus Protocol. For device specific information regarding Enron Modbus protocol, please see Enron Modbus Protocol for CB181 FCUs or Enron (AGA7) Modbus Protocol for 6400 (5333) FCUs.

Modbus Register Mapping

The A2-485 Node sends data to a SignalFire Telemetry Modbus gateway. The data that is sent to the gateway is available at the gateway in registers where it can then be read by a Modbus RTU.

In addition to the pre-configured registers read from the attached sensor, the A2-485 will send system information in 16-bit registers listed in the table below. This data is accessible at the same Slave ID as the connected Modbus device.

Status Registers

Register Number	Register Address (Offset)	Description
49988	9987 or 65524	Major revision number for the mainboard
49989	9988 or 65525	Minor revision number for the mainboard

49990	9989 or 65526	Major revision number for the radio
49991	9990 or 65527	Minor revision number for the radio
49992	9991 or 65528	High 16 bits of SFTS node address
49993	9992 or 65529	Low 16 bits of SFTS node address (the radio ID)
49994	9993 or 65530	Slave ID readback
49995	9994 or 65531	Received signal strength of last packet from the slave
49996	9995 or 65532	Battery voltage of the Modbus client, in millivolts
49997	9996 or 65533	Minutes until this slave will time out, unless new data is received
49998	9997 or 65534	Number of registers cached for this slave device
49999	9998 or 65535	Remote device type. 45 for Sentinel Modbus

Specifications

Enclosure Size	7.0″ tall × 4.25″ wide × 3.0″ deep (not including attached antenna)
Power Sources	Internal Lithium battery pack *SignalFire Part Number: A2-485-3XD* Solar battery system *SignalFire Part Number: A2-485-HCSolar* *DC Powered (10-30V) adapter: A2-485-DCDC*
Temperature Rating	-40°C to +80°C
Radio Frequency	902-928MHz ISM Band, FHSS radio, internal antenna
FCC Compliant Radio	FDD ID: W8V-SFTS500 IC: 8373A-SFTS500
Compliance	Class 1, Division 2 Groups A,B,C,D T4 Conforms to: UL 121201:2017 Ed.9+R:01Apr2021 UL 61010-1:2012 Ed.3+R:06Jun2023 UL 61010-2-201:2018 Ed.2+R:08Aug2022 Certified to: CSA C22.2#213:2017 Ed.3+U1;U2;U3 CSA C22.2#61010-1-12:2012 Ed.3+U1;U2;A1;U3 CSA C22.2#61010-2-201:2018 Ed.2

Hazardous Location Certification

The A2 is rated Class 1 Division 2 non-incendive when powered by its internal battery pack, High Capacity Solar Module, or its internal DC-DC converter.

WARNING: EXPLOSION HAZARD. DO NOT REMOVE OR REPLACE COMPONENTS UNLESS POWER HAS BEEN DISCONNECTED OR THE AREA IS FREE OF IGNITIBLE CONCENTRATIONS.
AVERTISSEMENT : RISQUE D'EXPLOSION . NE PAS RETIRER OU REMPLACER LES COMPOSANTS QUE L'ALIMENTATION EST DÉBRANCHÉ OU ZONE EST LIBRE DE CONCENTRATIONS IGNITIBLE.

WARNING – EXPLOSION HAZARD Substitution of components may impair suitability for Class I, Division 2
AVERTISSEMENT - RISQUE D'EXPLOSION. La substitution de composants peut rendre ce materiel inacceptable pour les emplacements de classe I, division 2

WARNING – EXPLOSION HAZARD Do not disconnect while circuit is live unless area is known to be nonhazardous
AVERTISSEMENT - RISQUE D'EXPLOSION. Ne débranchez pas lorsque le circuit est en direct , sauf si la zone est connue pour être nonhazardous

WARNING – All wiring methods must be in accordance with the NEC
AVERTISSEMENT - Toutes les méthodes de Essorez doivent être en conformité avec la NEC

WARNING - EXPLOSION HAZARD. Do no remove or replace while circuit is live unless the area is free of ignitable concentrations.
AVERTISSEMENT - RISQUE D'EXPLOSION. Ne pas enlever ou remplacer pendant que le circuit est vivant à moins que la zone soit exempt de concentrations ignitibles.

WARNING – EXPLOSION HAZARD. Do not remove or replace lamps, fuses or plug-in modules (as applicable) unless power has been disconnected or the area is free of ignitable concentrations.
AVERTISSEMENT - RISQUE D'EXPLOSION. Ne retirez ni ne remplacez les lampes, les fusibles ou les modules enfichables (le cas échéant) à moins que l'alimentation ait été coupée ou que la zone soit exempte de concentrations inflammables.