APPLICATION NOTE

Vaisala DST111 Remote Road Surface Temperature Sensor

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WHEN MEASUREMENTS MATTER

Vaisala DST111 Remote Road Surface Temperature Sensor

This application note describes using the Vaisala DST111 Remote Road Surface Temperature Sensor with Campbell Scientific dataloggers. Specifically the document includes installation information and programming.

General Information

The DST111 is a road condition sensor that uses infrared technology to provide measurements of surface temperature. Message 16 is the recommended message to get measurements. The values reported are.

- air temperature
- relative humidity
- dew point
- input voltage
- surface temperature
- DST111 hardware status

The DST111 has an RS-232 interface, and an RS-485 interface. The RS-485 interface provides a path for integrating the DCS111 Road Surface State Sensor from Vaisala. An MD485 (Campbell Scientific) provides the necessary interface to the DST111. It can be interrogated directly or through the DSC111 RS-485 bus.

Hardware

Setup

The only hardware setup involves the MD485. Use the Device Configurator Utility (Dev Config) to setup the MD485 (see Figure 1). The correct settings are 19.2 kb, transparent communication, and active ports of RS-232 and RS-485.
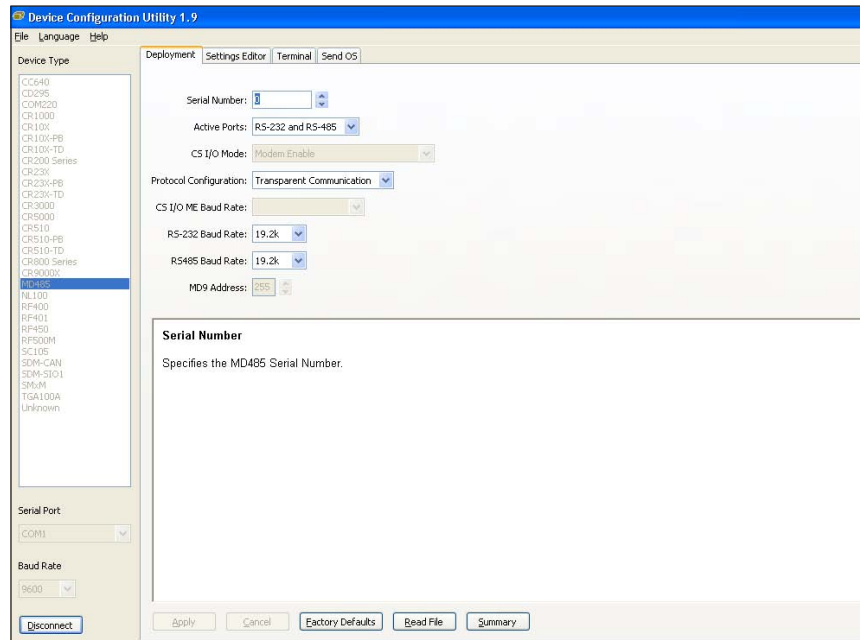

Figure 1. Dev Config screen showing proper MD485 setup.

Installation

The sensor directly mounts to our UT018 or UT018-5 crossarms. Further instructions relating to the set up and calibration are found in the manual. This includes pointing and distance calibrations for the sensor look on the roadway surface.

Electrical connections to Campbell equipment involve attaching sensor wires to power, and signal, and interconnections from the MD485 to the logger.

The program in this note uses the RS-232 port of the logger to talk to the sensors via an MD485 interface.

In the stand-alone mode, use the 18663 null modem cable to connect the CR1000's RS-232 port to the MD485's RS-232 port. When used with the DSC111, a cable is provided for bussing the RS-485 connections together. The sensor attaches to the MD485 as follows:

MD485	Sensor
gnd	gray
RS-485 A	black
RS-485 B	white
12V	brown
gnd	blue

Programming

To configure this sensor as a polled sensor start a hyper terminal session with appropriate comm parameters. Connect through the MD485 with a PC. In the configuration for the DST111 do the following:

AMES 1 0   the disables automatic output

Address 8 is the address that Vaisala picked for the sensor used with this program.

'DST variables

Public dstraw As String * 100
Public dstpoll As String

Public dstairtemp,dstairtempfilter As String
Public dstrh,dstrhfilter As String
Public dstdewpoint,dstdewpointfilter As String
Public dstinputvolt,dstinputvoltfilter As String
Public dstsurfacetemp,dstsurfacetempfilter As String
Public dsthardwarestatus,dsthardwarestatusfilter As String

'Define Data Tables

DataTable (dst,True,-1)
    DataInterval (0,10,Min,10)
    Sample (1,dstraw,String)
    Sample (1,dstairtemp,FP2)

```
          Sample (1,dstrh,FP2)
          Sample (1,dstdewpoint,FP2)
          Sample (1,dstinputvolt,FP2)
          Sample (1,dstsurfacetemp,FP2)
          Sample (1,dsthardwarestatus,FP2)
     EndTable

'Main Program
BeginProg

     'DST111 ir temperature poll string
     dstpoll=CHR(13)+CHR(64)+CHR(56)+CHR(32)+CHR(77)+CHR(32)+CHR(49)+CHR(54)+CHR(13)

     'dst filter definitions
     dstairtempfilter=CHR(13)+CHR(10)+CHR(48)+CHR(49)
     dstrhfilter=CHR(59)+CHR(48)+CHR(50)
     dstdewpointfilter=CHR(59)+CHR(48)+CHR(51)
     dstinputvoltfilter=CHR(59)+CHR(49)+CHR(52)
     dstsurfacetempfilter=CHR(59)+CHR(54)+CHR(48)
     dsthardwarestatusfilter=CHR(59)+CHR(54)+CHR(49)

     Scan (10,Sec,0,0)
          'DST measurement instructions
          'opens the serial port
          SerialOpen (COMRS232,9600,0,0,100)
          'send the poll command
          SerialOut (COMRS232,dstpoll,"",0,90)
          'delay prior to measurement
          Delay (1,200,mSec)
          'retiieve the data
          SerialInBlock (COMRS232,dstraw,98)

          'parse the variables
          SplitStr (dstairtemp,dstraw,dstairtempfilter,1,4)
          SplitStr (dstrh,dstraw,dstrhfilter,1,4)
          SplitStr (dstdewpoint,dstraw,dstdewpointfilter,1,4)
          SplitStr (dstinputvolt,dstraw,dstinputvoltfilter,1,4)
          SplitStr (dstsurfacetemp,dstraw,dstsurfacetempfilter,1,4)
          SplitStr (dsthardwarestatus,dstraw,dsthardwarestatusfilter,1,4)

          SerialClose (COMRS232)

          CallTable dst

     NextScan
EndProg
```