



## Integrating the ADR-1500 Particulate Monitor with the CR800 or CR1000 Sensor Application Note #20

### Overview

The Application Note will provide all of the necessary hardware and software integration information to integrate the MIE ADR-1500 Particulate Monitor with a Campbell Scientific CR800 or CR1000 Control Module.

The ADR-1500 is a real-time particulate monitoring system designed for continuous outdoor use.

Refer to the ADR-1500 Instruction Manual from more information on the ADR-1500 Particulate Monitor.

Refer to the MultiLogger User's Guide for more information on the MultiLogger software.

Refer to the Campbell Scientific CR800 or CR1000 Operators Manual for more information on the Control Module.

**Note: The gage types shown in the MultiLogger Configuration section are included in MultiLogger v5.1.5 and higher. The current version may be downloaded from the Support area at our website.**

### Hardware Interface

This Sensor Application Note will outline a direct RS-232 connection between the CR800 or CR1000 MCU and the ADR-1500. Wiring is below.

#### CR800/1000 COM1 Direct RS-232 Connection

CR800/1000	Description	RS-232 DB9
C1	Transmit Data	3
C2	Receive Data	2
G	Ground	5

#### CR800/1000 COM2 Direct RS-232 Connection

CR800/1000	Description	RS-232 DB9
C3	Transmit Data	3
C4	Receive Data	2
G	Ground	5

#### CR1000 COM3 Direct RS-232 Connection

CR1000	Description	RS-232 DB9
C5	Transmit Data	3
C6	Receive Data	2
G	Ground	5

#### CR1000 COM4 Direct RS-232 Connection

CR1000	Description	RS-232 DB9
C7	Transmit Data	3
C8	Receive Data	2
G	Ground	5

## MultiLogger Configuration

Select the menu item **Configure | Direct Connect Channels** on the Logger form to display the Channel Configuration form (or use the Direct Connect button on the Program tab). The following screenshots provide example configurations.

Read Particulate Concentration and Relative Humidity (RH) with single Direct Connection Channel via COM1 (COM2 also supported on the CR800. COM3 and COM4 supported on the CR1000)

**Configure Direct Connect Channels**

CHANNEL: Channel A | Channel B | Upper Channel

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16

Identification  
Label: CH\_1\_Part particulate  
Description: DirectCH\_1

Measurement  
Gage Type: Digital  
Make: ADR-1500  
Model: COM1 Particulate

Units Conversion  
Units Type: Default  
Input Units: None  
Output Units: None

Conversion Method  
 Linear  
 Polynomial

Temperature Correction  
 Apply  
Initial Temp: 0.00  
Temp Factor: 0.000

Linear Coefficients  
Zero Reading: 0.0  
Gage Factor: 1.0000  
Offset: 0.0

Polynomial Coefficients  
Coefficient A: 0.00000  
Coefficient B: 1.00000  
Coefficient C: 0.00000

Processing File  
None

Check Alarms  
None  
Alarm Low: 0.00  
Alarm High: 0.00

Copy Paste Print Help Accept Cancel

**Configure Direct Connect Channels**

CHANNEL: Channel A | Channel B | Upper Channel

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16

Identification  
Label: CH\_1B\_RH  
Description: DirectCH\_1B

Measurement  
Gage Type: Digital  
Make: ADR-1500  
Model: COM1 RH

Units Conversion  
Units Type: Default  
Input Units: None  
Output Units: None

Conversion Method  
 Linear  
 Polynomial

Temperature Correction  
 Apply  
Initial Temp: 0.00  
Temp Factor: 0.000

Linear Coefficients  
Zero Reading: 0.0  
Gage Factor: 1.0000  
Offset: 0.0

Polynomial Coefficients  
Coefficient A: 0.00000  
Coefficient B: 1.00000  
Coefficient C: 0.00000

Processing File  
None

Check Alarms  
None  
Alarm Low: 0.00  
Alarm High: 0.00

Copy Paste Print Help Accept Cancel

## **ADR-1500 Instruction Files**

The instruction files can be loaded into the editor by clicking the gear button located to the left of the selected **Model** option. Following are 2 example files.

### **Read Particulate Count Output of ADR-1500 Particulate Monitor with Direct COM1 Connection**

```
'Read a MIE ADR-1500 Particulate Monitor on COM1
ScratchLoc(1) = -99999
ScratchLoc(2) = -99999

'Open our port
SerialOpen(Com1, 19200, 16, 0, 255)

'Wake up the MIE ADR-1500 COM
Delay(0, 10, mSec)

'Get into the Operate menu
Do
  SerialOut(Com1, "DISPLAY" + CHR(13), "", 1, 10)
  Delay(0, 10, mSec)
  SerialIn(sInBuf, Com1, 50, 0, 100)

  SplitStr(ScratchStr(), sInBuf, CHR(34), 2, 7)
  ScratchStr(2) = Trim(ScratchStr(2))

  'Check for the OPERATE menu
  If (ScratchStr(2) <> "OPERATE")
    SerialOut(Com1, "KEY ESC" + CHR(13), "", 1, 10)
    Delay(0, 10, mSec)
  EndIf
Loop Until (ScratchStr(2) = "OPERATE")

'Disable logging
SerialOut(Com1, "KEY ENTER" + CHR(13), "0", 1, 50)
Delay(0, 25, mSec)
SerialOut(Com1, "KEY DOWN" + CHR(13), "0", 1, 50)
Delay(0, 25, mSec)
SerialOut(Com1, "KEY DOWN" + CHR(13), "0", 1, 50)
Delay(0, 25, mSec)
SerialOut(Com1, "KEY DOWN" + CHR(13), "0", 1, 50)
Delay(0, 25, mSec)
SerialOut(Com1, "KEY DOWN" + CHR(13), "0", 1, 50)
Delay(0, 50, mSec)

SerialOut(Com1, "DISPLAY" + CHR(13), "0", 1, 10)
Delay(0, 10, mSec)

SerialIn(sInBuf, Com1, 50, 0, 100)
SplitStr(ScratchStr(), sInBuf, CHR(34), 2, 7)
ScratchStr(2) = Trim(ScratchStr(2))

If (ScratchStr(2) = "LOGGING ENABLED") Then
  SerialOut(Com1, "KEY ENTER" + CHR(13), "", 1, 10)
  Delay(0, 25, mSec)
  SerialOut(Com1, "KEY DOWN" + CHR(13), "", 1, 10)
  Delay(0, 25, mSec)
  'Set Disabled
  SerialOut(Com1, "KEY ENTER" + CHR(13), "", 1, 10)
EndIf
```

```

'Get to the OPERATE menu and monitor.
Do
  SerialOut(Com1, "DISPLAY" + CHR(13), "", 1, 10)
  Delay(0, 10, mSec)
  SerialIn(sInBuf, Com1, 50, 0, 100)

  SplitStr(ScratchStr(), sInBuf, CHR(34), 2, 7)
  ScratchStr(2) = Trim(ScratchStr(2))

  If (ScratchStr(2) <> "OPERATE")
    SerialOut(Com1, "KEY ESC" + CHR(13), "", 1, 10)
    Delay(0, 10, mSec)
  EndIf
Loop Until (ScratchStr(2) = "OPERATE")

'Start ADR01500 monitoring process.
SerialOut(Com1, "KEY ENTER" + CHR(13), "", 1, 10)
Delay(0, 25, mSec)
SerialOut(Com1, "KEY ENTER" + CHR(13), "", 1, 10)

'Delay run for 1 minute.
Delay(0, 15, sec)

'Get output from sensor.
SerialOut(Com1, "OUTPUT" + CHR(13), "", 1, 10)
Delay(0, 25, mSec)
SerialIn(sInBuf, Com1, 50, 0, 100)
SplitStr(ScratchStr(), sInBuf, CHR(32), 4, 0)
mlReading = ScratchStr(1)

'Turn off compressor,
SerialOut(Com1, "KEY ESC" + CHR(13), "", 1, 10)
Delay(0, 25, mSec)
SerialOut(Com1, "KEY ENTER" + CHR(13), "", 1, 10)
Delay(0, 25, mSec)

'Close our serial port
SerialClose (Com1)

```