

# How to Interface Model 501 UV-Biometer, Version 3 to Campbell Datalogger CR10

## APPLICATION NOTE 118

### Connections

The 501 can be measured differentially only when the thermostat feature is used. In this case, be aware of its potential for high power drain on its power supply.

#### 501 .....CR10

Red .....2H  
Orange .....2L  
Brown .....3H  
Orange .....3L  
Black .....12V  
Blue .....G  
Yellow .....12V  
Green .....G

If the thermostat feature will not be used, do not connect the yellow or green leads. Insulate the ends of these leads to prevent shorting.

If the thermostat feature is to be switched off at night, a 12 volt switching circuit can be added to the 501 cable by Campbell Scientific. If a switching circuit has been added, the following wiring applies.

Yellow .....12V  
Green .....G  
Purple .....C1

### Programming

The following programming example is a guideline. Before deploying, careful testing must be done by each user to determine if all functions of their program are functioning properly.

\* .....1 .....Table 1 Programs  
01: .....1 .....Sec. Execution Interval

#### Section 1.0

Measure CR10 Battery Voltage

01: .....P .....10 ..Battery Voltage  
01 .....10 .....Loc[:BatoryVolt]

#### Section 2.0

Measure 501. Result is MEDs/Hour

Multiplier will equal 1 MED Hr-1 / xxx mV. Consult the 501 documentation for the xxx millivolt calibration value. A typical value is 0.003. In this case the multiplier would equal (1 MED Hr-1 / 300mV) or 0.00333.

The offset will equal the dark value multiplied by -1. The dark value is measured with the correct multiplier and a preliminary offset of zero.

02: .....P .....2 .....Volt(DIFF)  
01: .....1 .....Rep  
02: .....25 .....2500mV 60 Hz rejection  
.....Range  
03: .....2 .....IN Chan  
04: .....1 .....Loc[:MED / Hr]  
05: .....Mult User entered value  
06: .....Offset User entered value

#### Section 3.0

Control thermostat for day on / night off operation.

This option may be used if Campbell Scientific has added a 12V control circuit to your cable. Control is based on the UV measurement, assuming that it will be a minimum value at night. If the measurement is greater than or equal to 0.01, then daylight is presumed and the power is either switched on or left on. If the measurement is less than 0.01, darkness is presumed and the power is switched off.

03: .....P .....2 .....Volt(DIFF)  
01: .....1 .....X Loc MED / Hr  
02: .....3 .....>=  
03: .....0.01 .....F  
04: .....30 .....Then Do

04: .....P .....86 .....Do  
01: .....41 .....Set high Port 1

05: .....P .....94 .....Else

06: .....P .....86 .....Do  
01: .....51 .....Set low port 1

07: .....P .....95 .....End

#### Section 4.0

Measure 501 Temperature Sensor

08: .....P .....2 .....Volt(DIFF)  
01: .....1 .....Rep  
02: .....25 .....2500 mV 60 Hz rejection  
.....Range  
03: .....3 .....IN Chan  
04: .....2 .....Loc[:501\_Temp]  
05: .....0.05 .....Mult  
06: .....-25 .....Offset

# How to Interface Model 501 UV-Biometer, Version 3 to Campbell Datalogger CR10

## APPLICATION NOTE 118

### Section 5.0

This section is used if the 501 thermostating feature is not used. This section applies a temperature effect correction factor of 1.0% per degree C using the following formula:

$$\text{SUVcorr} = \frac{\text{SUVmeas}}{1 + (\text{T det} - 25) \times 0.01}$$

where SUVmeas is 'MED/Hr' prior to correction, SUVcorr is 'MED/Hr' after correction, and Tdet is '501\_Temp'.

09: .....P .....34 ...Z=X+F  
01: .....2 ...X Loc 501\_Temp  
02: .....-25 ...F User input: Temp in  
.....degrees C at  
03: .....3 ...ZLOC[:TcorFactr]calibration \* -1

10: .....P .....37 ...Z=X+F  
01: .....3 ...X Loc TcorFactr  
02: .....01 ...F  
03: .....3 ...Z Loc [:TcorFactr]

11: .....P .....34 ...Z=X+F  
01: .....3 ...X Loc TcorFactr  
02: .....1 ...F  
03: .....3 ...Z Loc[:TcorFactr]

12: .....P .....38 ...Z=X/Y  
01: .....1 ...X Loc MED/Hr  
02: .....3 ...Y Loc TcorFactr  
03: .....1 ...Z Loc[:MED/Hr]

### Section 6.0

Calculate KW/m2 from MEDs/Hr. The conversion factor from Solar Light Co. is 58.3E-6 kW/m2 / MED/Hr. This is performed in two steps.

13: .....P .....37 ...Z=X\*F  
01: .....1 ...X Loc MED/HR  
02: .....5.85 ...F  
03: .....11 ...Z Loc[:kWm^-2]

14: .....P .....37 ...Z=X\*F  
01: .....11 ...X Loc kWm^-2  
02: .....0.00001 ...F  
03: .....11 ...Z Loc[:kWm^-2]

### Section 7.0

Calculate MEDs and kJ m-2

15: .....P .....30 ...Z=F  
01: .....2.7778F  
(Execution Interval in seconds / 3600)  
02: .....4 ...Exponent of 10  
03: .....6 ...Z Loc[:HrsLapsed]

16: .....P .....36 ...Z=X\*Y  
01: .....1 ...X Loc MED/Hr  
02: .....6 ...Y Loc HrsLapsed  
03: .....7 ...Z Loc[:MEDs]

17: .....P .....37 ...Z=X\*F  
01: .....11 ...X Loc kW m^-2  
02: .....1 ...F (Execution Interval in Seconds)  
03: .....12 ...Z Loc[:kJ m^-2]

### Section 8.0

Output hourly averages (MED / Hr, kW / m2) and totals (MEDs, kJ / m2)

18: .....P .....92 ...If time is  
01: .....0 ...minutes (seconds—) into a  
02: .....60 ...minute or second interval  
03: .....10 ...set high Flag 0 (output)

19: .....P .....77 ...Real Time  
01: .....220 ...Day,Hour-Minute

20: .....P .....71 ...Average  
01: .....1 ...Rep  
02: .....1 ...Loc MED / Hr

21: .....P .....71 ...Average  
01: .....1 ...Rep  
02: .....11 ...Loc kW m^-2

22: .....P .....72 ...Totalize  
01: .....1 ...Rep  
02: .....7 ...Loc MEDs

23: .....P .....72 ...Totalize  
01: .....1 ...Rep  
02: .....12 ...Loc kJ m^-2



721 Oak Lane • Philadelphia, PA 19126-3342  
Tel: (215) 927-4206 • Fax: (215) 927-6347  
E-mail: [info@solar.com](mailto:info@solar.com) • Internet: [www.solar.com](http://www.solar.com)