



## Using the SDM-AO4/CVO4 Continuous Analog Output Modules

### MultiLogger Application Note #12

#### Overview

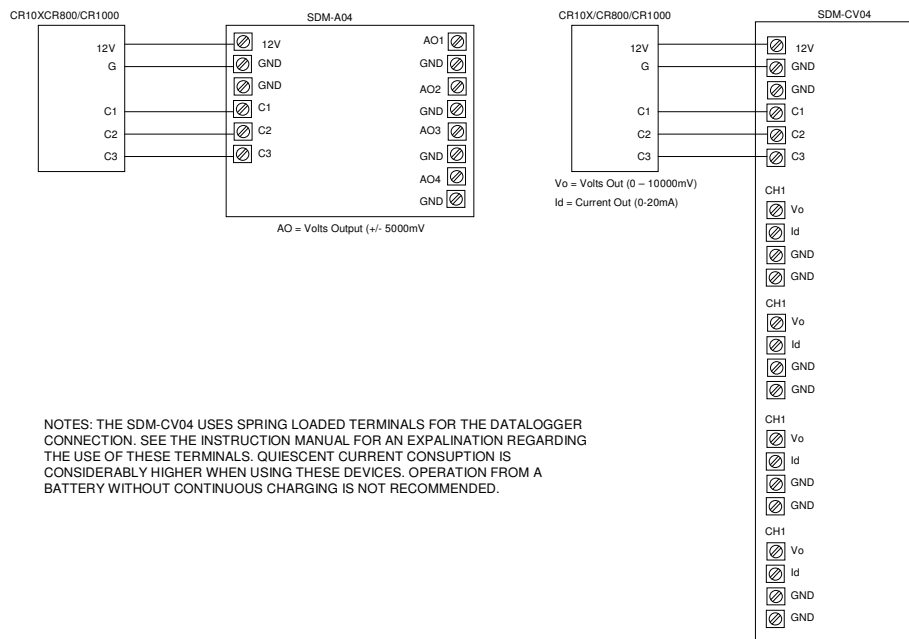
This MultiLogger Application Note will provide information on using the continuous analog output modules manufactured by Campbell Scientific, the SDM-AO4 and SDM-CVO4. These synchronous peripherals are very similar, both offer 4 channels of analog output capability, scaled accordingly to input storage values of the control module, however the CVO4 offers 0-20mA output current capability, via an internal jumper, or software override, as well as the voltage output. Also, the voltage output capabilities of the two devices are implemented slightly differently, the A04 outputs +/-5000mV (in 2.5mV increments) for an input storage value of +/-5000, the CVO4 will output 0-10000mV (in 2.5mV increments) for the input storage value of 0-10000 range. In current mode it outputs 0-20mA for the input storage value of 0-20000 range.

Please see the SDM-AO4 or SDM-CVO4 Instruction Manuals for more information on these devices.

Note: Some of the functionality described in this Application Note was added to MultiLogger beginning with v2.1.4, please contact Canary Systems or your software vendor to obtain the updated software via the Internet, without charge to registered users.

#### Wiring

The SDM-AO4 and SDM-CVO4 are synchronously addressed datalogger peripherals which means they are controlled by connecting them to the first 3 control ports of the CR10X/CR800/CR1000. They are addressable, up to 16 devices may be connected to the 3 control ports by configuring a unique address for each unit. Typical wiring is shown below.



## Software Configuration

There are essentially 3 steps for configuring MultiLogger to use these SDM devices.

1. The Direct Connect or Multiplexer channels to be used for controlling the continuous output must be configured. Configuring the channels requires selection of an appropriate **Type** | **Make** | **Model** and then entering scaling factors to convert to the engineering units that will be used to set the continuous output value. An example screenshot illustrating a configuration to read a pressure transducer and convert to feet of water is shown below. Let's assume the transducer has a 50 psi full-scale range, or 115.5' water.

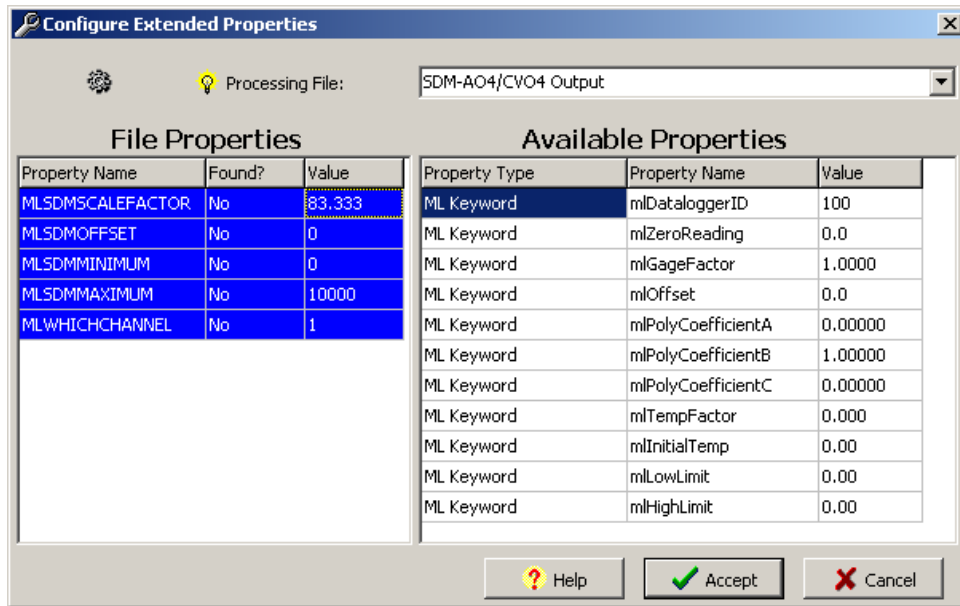
The screenshot shows the 'Channel Configuration Multiplexer #1' dialog box. Channel 1 is selected. The configuration includes: Label: PZ\_1A, Description: Mux\_1CH\_1, Gage Type: Vibrating Wire, Make: Geokon, Model: 4500VWDSP. Units Conversion: Units Type: Pressure, Input Units: psi, Output Units: feet H2O. Conversion Method: Linear. Linear Coefficients: Zero Reading: 9045.987, Gage Factor: -0.1291, Offset: 0.0. Polynomial Coefficients: Coefficient A: 0.00000, Coefficient B: 1.00000, Coefficient C: 0.00000. Upper Channel: Label: PZ\_1ATemp, Description: Mux\_1CH\_1Temp, Device: VWDSP\_THERMA, Units: °C. Check Alarms: Type: Low and High, Alarm Low: 80, Alarm High: 120. Buttons: Copy, Paste, Print, Help, Accept, Cancel.

2. The second step is to configure the **Extended Properties** for each channel to be output to the SDM. This is done by pressing the Extended Properties button located to the left of the **Model** shown on the Channel Configuration form.

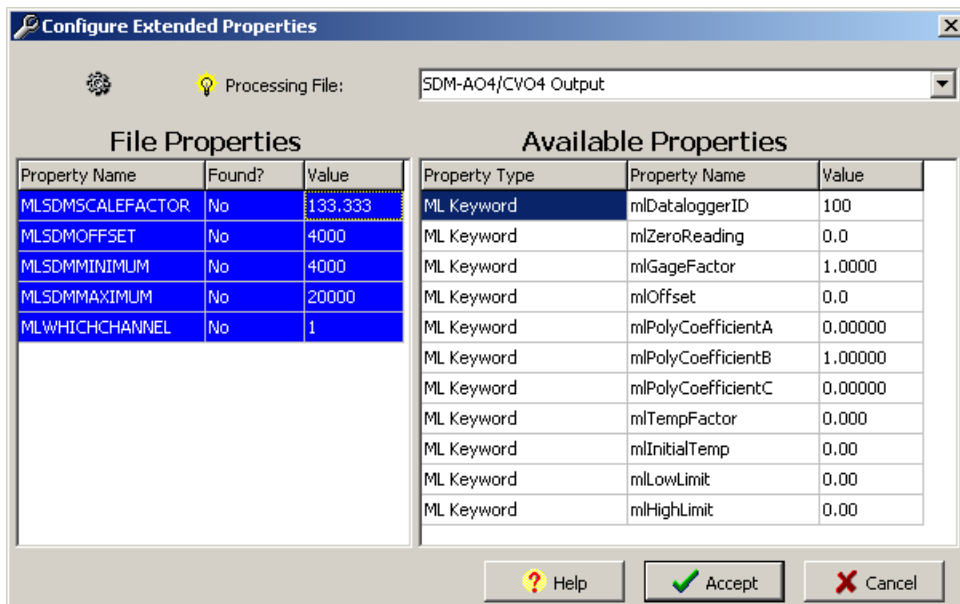
The screenshot shows the 'Channel Configuration Multiplexer #1' dialog box, identical to the first screenshot. A red arrow points to the 'Extended Properties' button (represented by a gear icon) located to the left of the Model field.



For example, consider this example of converting the 0-120' output of the channel measurement to 0-10V to be output by an SDM-CV04. The full-scale output of the SDM-CVO4 (10V) is set with a value of 10000, so the scale factor will be  $10000/120$ , or 83.3333.

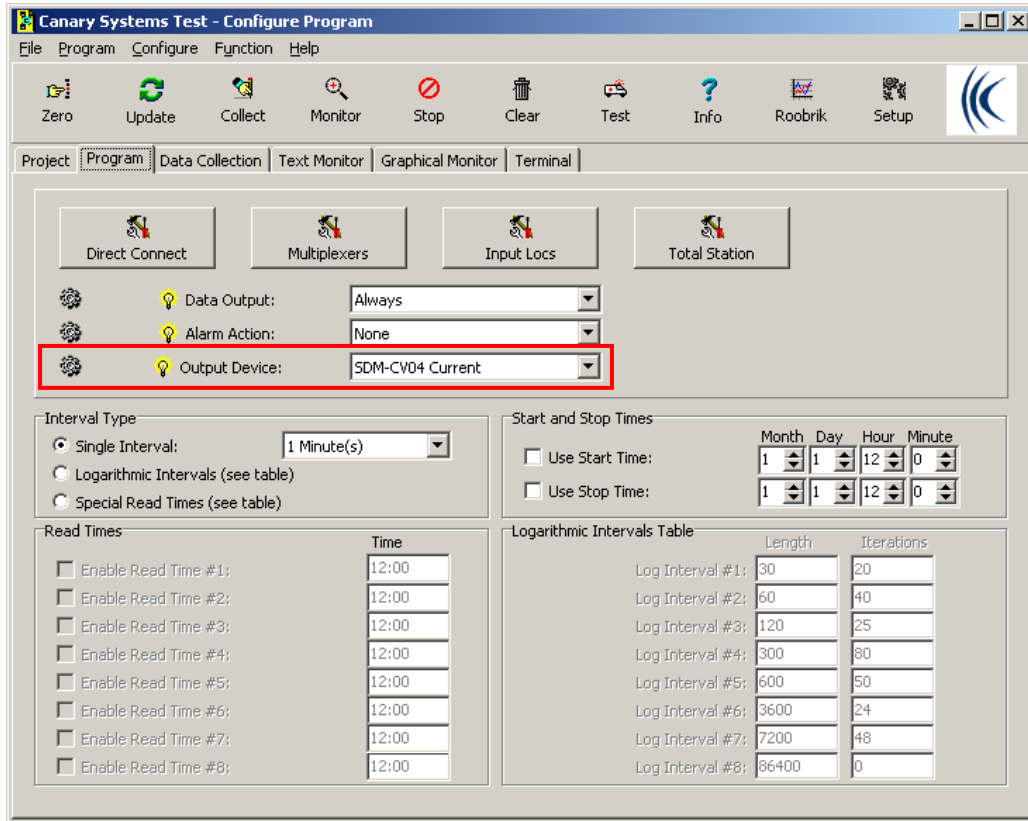


Consider the same instrument and output, except scaled for 4-20mA output using the SDM-CVO4. The full-scale output of the SDM-CVO4 (20mA) in current mode is set with a value of 20000, so the scale factor will be  $16000/120$ , or 133.333. The value of 16000 is derived by subtracting the value of the full-scale reading (at 20mA or 20000) from the value of the low-scale reading (at 4mA or 4000).



Once all **Values** have been configured then press **Accept** to save these changes for this channel. You will need to repeat this configuration step for EACH CHANNEL to be used for SDM output.

- The last step is to activate the outputs of the SDM device, this is done by selecting the appropriate **Output Device** on the Program tab, as shown below:



Select the Output Device to match the SDM peripheral attached and the type of output desired:

**SDM-AO4** – Output the values for voltage output to one or more SDM-AO4's.

**SDM-CVO4 Voltage** – Output the values for voltage output to one or more SDM-CV04's.

**SDM-CVO4 Current** – Output the values for current output to one or more SDM-CV04's.

You may also need to adjust the Reps parameter for the number of channels to be output. Press the gear button located to the left of the **Output Device** edit to load the programming into MLEditor, note the Reps parameter. The default is 16, so up to 4 SDM devices connected with the first address as 0. Adjust this number in multiples of 4 depending on the number of channels to output and the number of SDM devices attached. Press **Save** once changes are complete and close MLEditor.

