SPN1 High Speed logging

Rev	Date	By	Reason
1	9 Jan 08	John	Creation

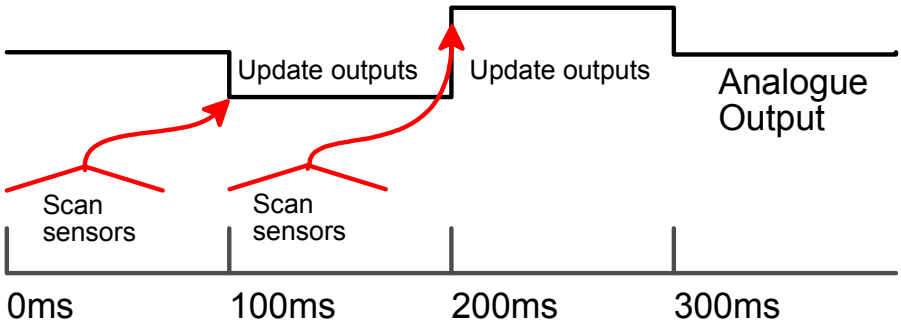
The SPN1 has a much faster response time than most pyranometers, and this application note summarises how to retrieve the data at logging rates faster than 1 per second. Please refer to the SPN1 User Manual for a description of the SPN1 analogue and serial interfaces.

Measurement timings

The SPN1 takes approx 10ms per thermopile to make its measurements, so a complete scan takes about 70ms. A further 30ms is taken to do the calculations of Global & Diffuse values. The thermopiles themselves have a time constant of 18ms. As long as the incident radiation is not changing significantly during the 70ms scan period, the output will be accurate, and a complete reading cycle will take about 100ms.

Analogue output

When the DL-Power wire has 5V present, the analogue outputs are updated every 100ms, and this can be measured with a fast datalogger. The updates can be delayed if the SPN1 has to respond to any serial port commands, so we recommend you don't use both types of connection if you want fast response.



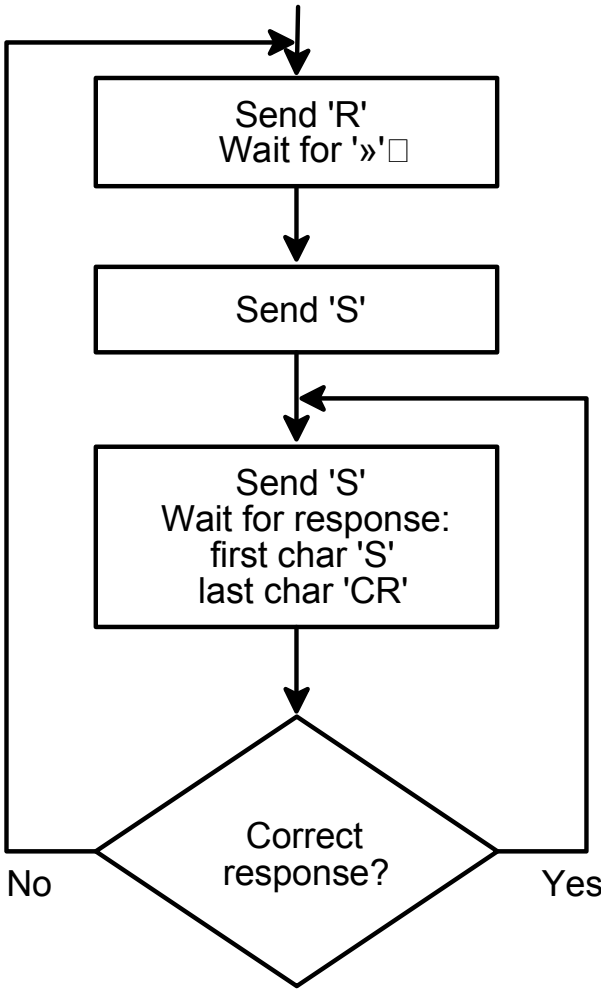
Serial output

If the DL-Power wire is not powered, the analogue outputs are not enabled, and readings can be taken via the serial cable. The SPN1 must be powered via it's heater cable, or via the white Power in wire in the serial connector (this normally takes the necessary power from the RS232 DTR signal).

After a reading is initiated by an "S", the "S" is echoed back immediately. Scanning the 7 thermopiles takes 70ms, calculation takes 30ms, and the response is placed in the output buffer after 100ms, and the SPN1 is ready for another command. It takes a further 20ms – 25ms for the response to be transmitted.

The simplest communication loop is to send an "S" command, wait for the response, and then repeat the cycle. This takes about 130ms per loop, plus any time necessary for the receiving computer to process the responses.

Because the SPN1 serial input and output is fully buffered, it is possible to operate more efficiently by making sure that another command is waiting to initiate the next reading as soon as the previous one has finished. This will give a reading every 100ms. This is achieved by adding an extra "S" command at the start of the process, so the SPN1 always has an extra command in its buffer.



Puts the SPN1 into a known state

Clear the receiving computer input buffers as well

Make sure the next command is always waiting in the input buffer

The response is actually from the previous command.

Check that the response has the form

`Stttt.t,dddd.d,s<CR>`

A Windows program for collecting data on a PC is available from Delta-T Devices Ltd.