Eco-Line Cereal User Manual

V1.01 – 17th March 2016

Eco-Line Cereal User Manual

(This User Manual applies to devices using the PCB version dt331-7 with firmware version V1.01)

This product is a variation of the Eco-Line Signal Converter modified to work only with serial communications. The input can be read and the output written to using a simple ASCII communications protocol.

The Status LED will flash on power up and remain on when power is applied.

The Alarm LED will become the Output LED and will flash briefly when an output command is received and will come on for a 500 mSec when the Output Minimum Set command is received and flash twice at 500 mSec when the Output Maximum Set command is received.

The Input LED and will flash when an Input command is received and will come on for 500 mSec when the Input Minimum Set command is received and twice at 500 mSec when the Input Maximum Set command is received.

The push button and the zero and span trimpots may not be fitted and will not have any function for this version.

The serial communications is done via the communications connector jack plug socket on the front of the unit using a USB to Eco-Line configuration cable (1.8 m long). The cable includes a FTDI USB to Serial chip and is used as a Virtual Com Port (VCP). Driver updates and more information can be found at http://www.ftdichip.com .

For now we will only offer one communications speed at 9600 bps, 8 N 1. (we can offer other speeds and will probably be DIP switch selectable in the future).

Any of the Eco-Line inputs and outputs can be configured (see the Eco-Line Product Brochure and Part Numbering Documents). Standard configuration is 4-20 mA input and 4-20 mA output.

The device features four way galvanic isolation >1000 VAC – input/output/power supply/serial comms, each is isolated from each other.

The commands are as follows (for this version):
Input Measurement Communications:
ar = read raw value
as = read scaled value
az = captures the present input as input minimum
ax = captures the present input as input maximum

Always replies in the format a:vwxyz<cr><lf>

Typical input values are:
Input at 4 mA with each line terminated with <cr>:
ar   <send read raw value command to the Eco-Line>
a:0821   <reply with the raw A to D input>

az   < captures the 4 mA input as input minimum for input scaling>

Input at 20 mA with each line terminated with <cr>:
ar   <send read raw value command to the Eco-Line>
a:3865   <reply with the raw A to D input>

ax   < captures the 20 mA input as input maximum for input scaling>

Now having set up the input scaling (this will have been done before being delivered) you can expect the following when reading the scaled input values:

Input (mA)	Raw reply	Scaled Reply
0	60	250
3	631	1563
4	821	2000
8	1582	3750
12	2343	5500
16	3104	7250
20	3865	9000
21	4055	9436

Output Communications –
Serial commands (as example for a device with one output):
qr = write output raw value
qs = write output scaled value
qz = captures the present analogue output value as output minimum
qx= captures the present analogue output value as output maximum
For now the output does not reply at all.

The scaled values are between 2000 and 9000. The raw values are between 0 and 4095.

Typical output values are:
Command terminated with a <cr>:
qr1072   <send raw output value of 1072 to output DAC>
The output will be around 4.00 mA

qz   <captures the present raw analogue output value as output minimum>

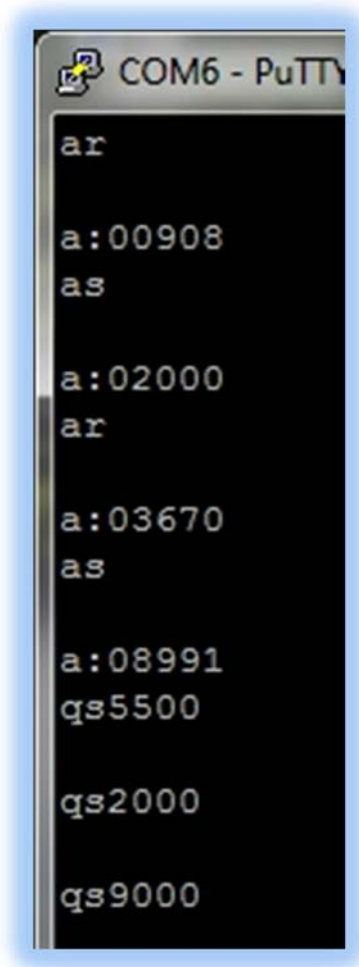qr3588   <send raw output value of 3588 to output DAC>
The output will be around 20.00 mA

qx   <captures the present raw analogue output value as output maximum>

Now having set up the output scaling (this will have been done before being delivered) you can expect the following when sending the scaled output values:

Scaled value sent	Output (mA)
400	0.344
1000	1.72
2000	4.00
5500	12.00
9000	20.00
9400	20.91

```
COM6 - PuTTY

ar

a:00908
as

a:02000
ar

a:03670
as

a:08991
qs5500

qs2000

qs9000
```

Example Python Program

This simple program reads a csv file with a list of values in column A (as many as you like) and sends it to the Eco-Line Cereal (my data was used to simulate a loadcell output at one second intervals):

```python
import serial
import time
import csv

ser = serial.Serial()
ser.baudrate = 115200
ser.port = 2
ser.open()

ifile  = open('Strain Gauge #1 clipped scaled day 1_5 to 3_5 - RAW.csv', "rb")
reader = csv.reader(ifile)

rownum = 0
for row in reader:

    print '%u  %s' % (rownum,str(row).strip('['"""']'))
#    print '%u %s' % (rownum,row)

#    print(rownum,row)
    ser.write("qs"+str(row).strip('['"""']')+ chr(13))
#    time.sleep(0.1)
    time.sleep(0.01)    #this results in 1 data second = 66mS when replayed
#    time.sleep(1)    #this results in 1 data second = 1 S when replayed
    rownum += 1
ifile.close()

ser.close()
```

Specifications

1. Standard inputs (DIP switch selectable): 4-20 mA, 0-20 mA, 0-100 mV, 0-1 V, 0-10 V, 0-100 V, ±1 V, ±10 V, (others possible).
2. Factory configurable inputs are typically (see Eco-Line Part Numbering document for many more customised options):
   2.1. Temperature: pt100, pt1000
   2.2. Resistance: 0-100 Ω, 0-1 kΩ, 0-10 kΩ
   2.3. DC Current: 0-200 mA, 0-1 A, 0-5 A, 0-10 A

3. Standard outputs (DIP switch selectable): 4-20 mA, 0-20 mA, 0-5 V, 0-10 V, ±10 V (we will be adding a 0-100 mV output option in the future for simulating thermocouples).

4. Isolation 1000 VAC – four way isolation between input, output, auxiliary power supply and comms.

5. Power-On/Status LED indication.

6. Microprocessor based.

7. Linearity better than 0.1% of full scale.

8. Auxiliary supplies 12 VDC or 24 VDC ±10% (must be specified with order).
   Auxiliary supply current: 12 VDC at 80mA + Iout, 24 VDC at 45mA + Iout.

9. Operating temperature -10°C to 70°C.

10. DIN rail mounting with flame proof high quality enclosure.

11. Screw terminal connections for wire diameter 2.5 mm^2.

12. Dimensions 25 x 80 x 85 mm (W x H x D).

Part Numbering

The part numbering is the same as for the Eco-Line Signal Converter with the addition of a C into the part number and the redefinition of the i term (not used and left out for now):
GB-SE**C**/k*g*-n*t*/ip   Eco-Line Cere*a*l [input]/[output] [aux supply]

So a very standard part would be:

GB-SEC/IA-IA/C   Eco-Line Cereal 4-20mA/4-20mA 24VDC