Arduino interface to DECADES

Installation Howto (M Hobby – Oct 2013)

1. Download and install the Arduino IDE (version 1.0.5) from
   http://arduino.cc/en/Main/Software
2. Find the Arduino path. On my windows 7 machine, the path is C:\Program Files
   (x86)\Arduino\ . Explore down to the '…..\Libraries\Ethernet' subdirectory.
3. Rename Ethernet.cpp to Ethernet.cppold and Ethernet.h to Ethernet.hold
4. Copy Ethernet.cpp and Ethernet.h into the '…..\Libraries\Ethernet' subdirectory'. This
   enhances the existing library and provides UDP multicast support.
5. Download the SdFat libraries from:
   https://code.google.com/p/sdfatlib/downloads/list
   Extract and place the extracted 'SdFat' directory in <arduino path[1]>\libraries\
   This adds more comprehensive tools for SD cards and FAT analysis than the standard
   Arduino libraries
6. Copy the 'arduinoDecades_x.x' directory to <Documents>\Arduino. This is where the
   Arduino IDE stores your project – known as sketch books.
7. Change into the 'arduinoDecades_x.x' directory and double click on the
   'arduinoDecades_x.x.ino' file. This will load up the firmware code into the IDE.
8. In the top left corner of the IDE, you will see a right pointing arrow (second icon on the left).
   Hover over the icon and the words 'Upload' will appear next to the icons. Click this. This will
   compile the firmware code and load into Arduino/Atmel flash. A status bar at the bottom
   informs of progress, first in compiling, then in uploading the code.
9. Once the upload is complete, the firmware code will start straight away. TCP packets will be
   sent to both tanks. UDP multicast packets will be transmitted.
10. A debug serial monitor can be opened to view debug information (e.g. – tank ip addresses,
    etc.). This can be done from within the Arduino IDE using the icon in the top right of the IDE.
    Opening a serial debug connection to the Arduino will reboot the firmware.
11. Note that configuration settings are set by default to the following values in the firmware.

Local IP: 192.168.1.79
Gateway: 192.168.1.253
Data Tank A: 192. 168. 101. 110:3502
Data Tank B: 192. 168. 101. 108:3502
UDP Multicast address: 239. 1. 4. 7:50001
NTP Server: 192.168.101.2

These values are overwritten by those stored in the file 'arddCon.cfg' stored on the SD card.
The '.cfg' file should look as follows:

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[1] On my windows 7 machine, the path is C:\Program Files (x86)\Arduino\

```
I=$ARDD0001
L=192.168.101.17
G=192.168.101.254
A=192. 168. 101. 110:3502
B=192. 168. 101. 108:3502
C=239.1.4.7:50001
N=192.168.101.2
```

An example file is included in the repository. Note that the Gateway connection ('G') is only relevant for systems where the NTP server is outside of the subnet (e.g. – during test and debug).

12. The data structure of the TCP and UDP packets are provided in the csv files within the repository. These definition files are in keeping with the FAAM DECADES specification

13. The columns in the Serial debug are given by :

Column	Indentity
1	Local NTP time (whole)
2	Local NTP time (fractional)
3	Arduino uProc internal millisecond count
4	NTP clock resync flag (high, when uProc clock as just been synchronised to NTP)
5	Field Mill sensor data – raw ADC count

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