

Escort Data Logging Systems Ltd.

Cool Down Logger

Specification

Rev 4.1

13th February 2004

Release notes:

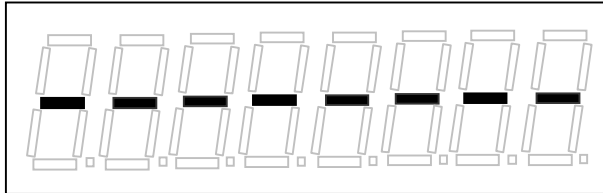
- 1.0: WH Initial
- 2.0: 26 Feb 03 JAL Reordered some of the sections
- 3.0: JAL 14 Mar 03 Allow mag-swipe to restart after finish. Change "COOL" to "ASLEEP"
- 3.1: JAL 19 Mar 03 "FAIL" timeout changed from 1h to 3h
- 3.2: JAL 21 Mar 03 Leading-zero suppression implemented for temperature
- 3.3: JAL 31 Mar 03 "Future features" list extended
- 3.4: AM/JAL 7 Apr 03 "Future features" done, "Fail" defn. added, software to show sensor reading
- 4.0 AM/FRC 25 Sep 03 Replaceable battery, non-volatile memory, C Range, switch, resettable
- 4.1 AM/WCH 9 Feb 04 New PCB, daylight-saving

General features

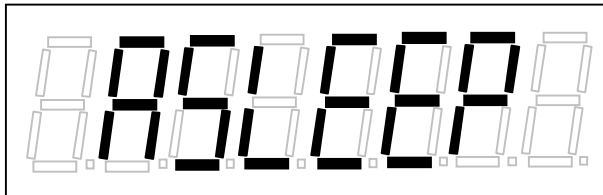
- The 8 digit Junior LCD
- Active and Alarm (“Fail”) LEDs
- Pushbutton start
- Resettable at any time, by holding button for 12 seconds
- Daylight-saving toggled, by holding button for further 10 seconds
- No beeper
- 1200 baud RS232 communications
- One permanently connected thermistor sensor, on a flexible PTFE cable extending from a hole drilled in the case near the communications socket, and fitted with 80mm stainless steel probe.
- Probe range -20°C to 100 °C (C range)
- The logger itself will need to remain below 80°C
- Accuracy of ±1°F (0.6°C)
- Time accurate to ±1 minute per month
- Not hermetically sealed
- Display in °F or °C
- User-replaceable battery
- Low battery indication
- The logger determines a FAIL condition as follows: Timing starts at 60°C/140°F, the temperature 2 hours later must be below 21°C/70°F, and at 6 hours must be below 5°C/41°F.

- **Functionality**

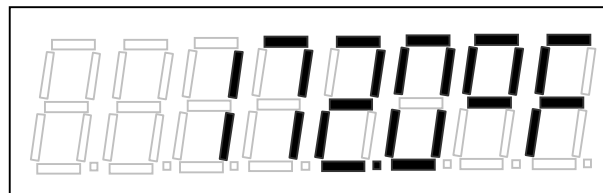
After inserting the batteries, both LEDs are active, and the display shows



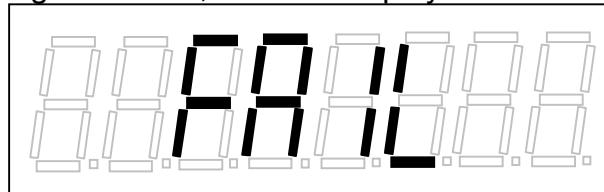
After programming by PC software, the Cooldown logger displays:



The logger begins its program when the pushbutton is pressed. With the program started the display shows the current temperature:



The logger measures and displays (but does not record) the temperature every 30 seconds. If 3 hours elapse without the “trigger” transition from above to below 60°C being measured, then the display shows 'FAIL':



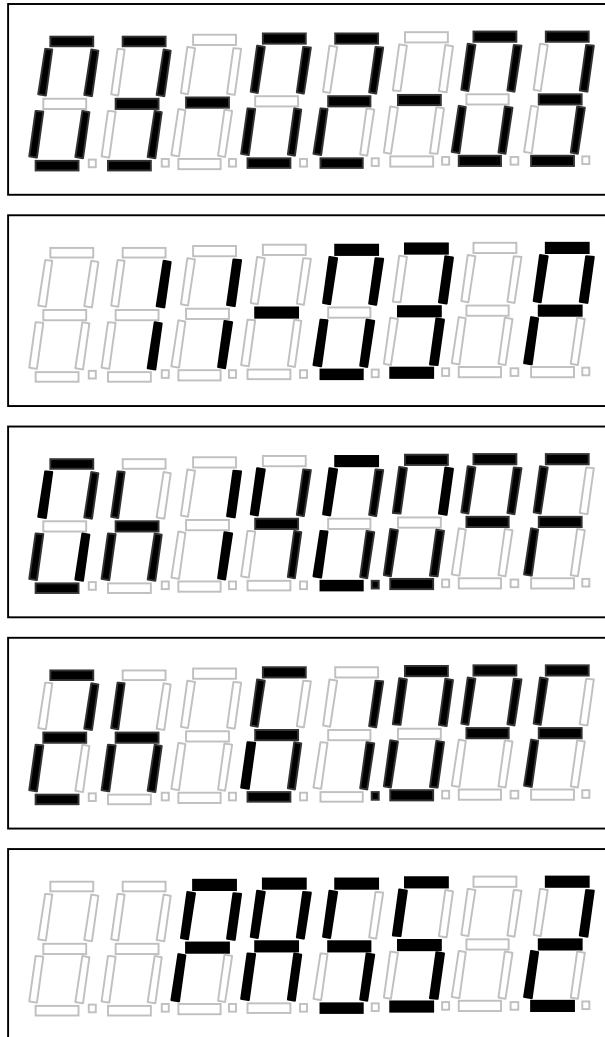
When the temperature falls to 60°C (140°F) the date, time and temperature is recorded and an internal timer is started. The display alternates between the date, time and temperature, showing each for 4 seconds.

- start date
- start time
- start temperature (60°C 140°F)
- Pass 1

After 2 hours have elapsed since the trigger (at 60°C, 140°F) the temperature is measured and added to the display. If the temperature is above 21°C (70°F) the logger Fails the trip.

- start date
- start time
- start temperature
- 2h temperature
- Pass 2 (or Fail)

The displayed data look like this:



This cycle is repeated for the next two hours.

After 4 hours have elapsed since the trigger (at 60°C, 140°F) the logger takes a further reading and alternate the following displays;

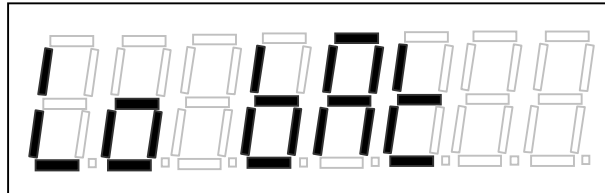
- start date
- start time
- start temperature
- 2h temperature
- 4h temperature
- Pass 3 (or Fail)

This cycle is repeated for the next two hours.

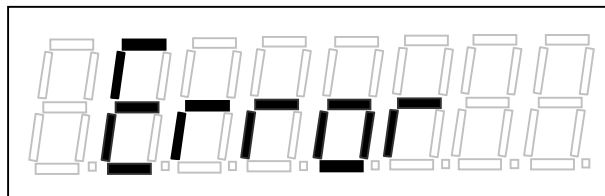
After 6 hours have elapsed since the trigger (at 60°C, 140°F) the logger takes a final reading and adds it to the display list. If the temperature is above 5°C (41°F) at this time the logger Fails the trip. The logger takes no further readings and keeps cycling the display in the above fashion until reset. The logger shows Pass or Fail.

If LEDs are fitted and active, they flash every 4 seconds. The Green LED is active all the time except when “asleep”. The Red LED is active after a “Fail” condition.

At any time, if a low battery condition is detected it is indicated as shown below. This is shown once per display cycle and comes immediately prior to the date.

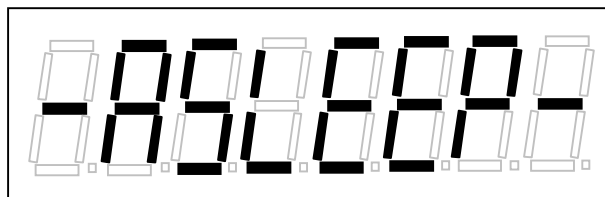


If the following display appears, it indicates an internal hardware malfunction, and the logger should be returned to the factory (or discarded).



Preparing for Re-use

Once the program is completed, the logger can be re-armed to the ready-to-go (“ASLEEP”) state by push-button. 10 seconds after this, it is ready to be restarted by another button press. This long delay is necessary, in case the user inadvertently operates the button twice. During this time, the display shows



If the button is *still* held pressed at the end of this time, the daylight-saving setting is toggled. If this occurs, the new setting is displayed as “DYLS On” or “DYLS Off” as appropriate. Note that it will not go back one hour during the first hour of the day, or go forward during the last.

The program can be prematurely cancelled at any time by holding the button pressed for 12 seconds.

Communications

The logger communications are as per the Mini 2000. A standard 9-pin RS232 extension cable is required.