



STELR - sustainable housing: dual temp. logger

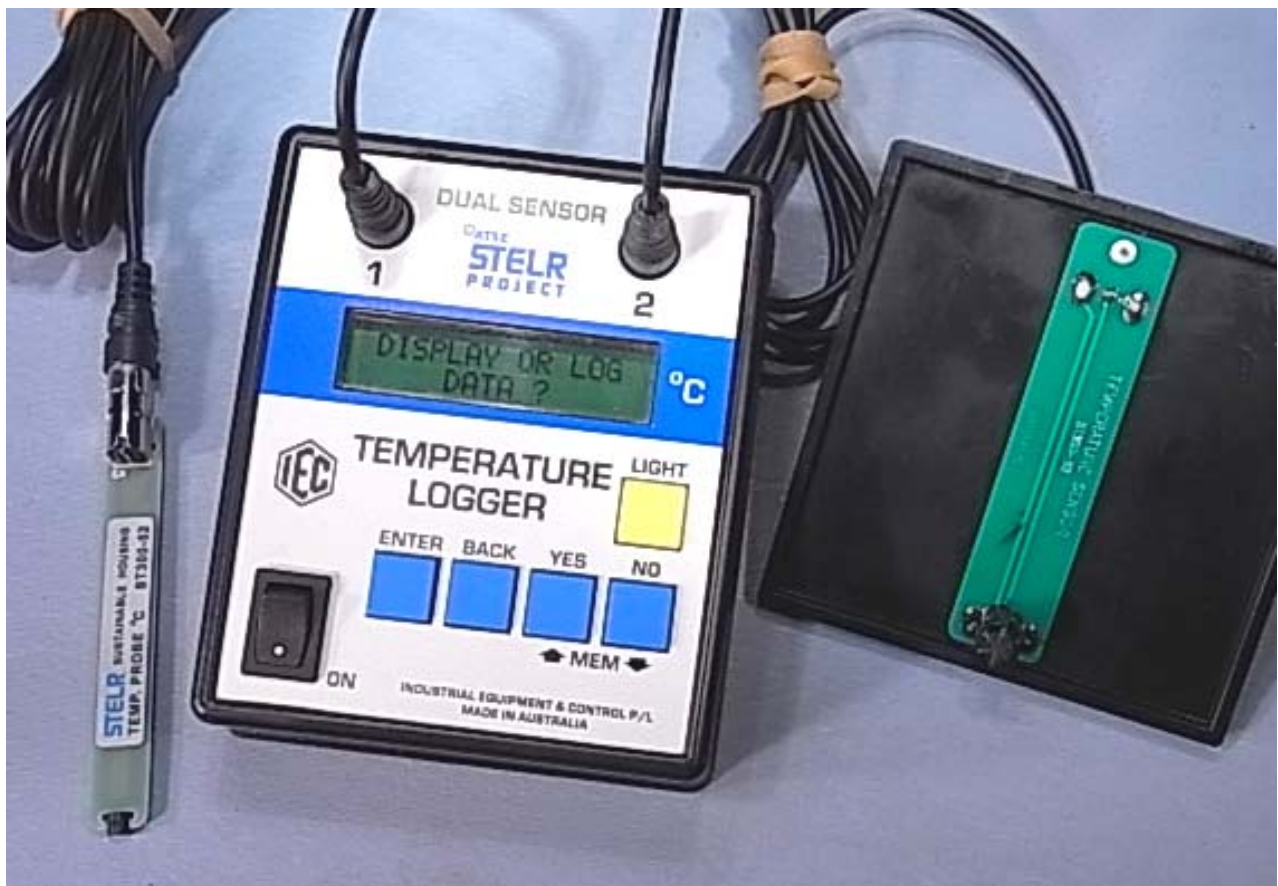
ST300-80 Dual Temperature Logger. Internal 9V Alkaline Battery or 12V.AC/DC.

DESCRIPTION: The STELR Sustainable Housing Dual Temperature Logger is a convenient and compact system for measuring two separate temperatures over a period of time and storing the results away internally or into a computer to be handled by Windows "Excel".

The Logger contains a 9V Alkaline battery which provides many hours of continuous use and is replaced by removing the rear panel. To conserve the battery power, the STELR kit contains a 240V/12V AC power supply and a special cable for power connection to the Logger.

Two RCA sockets permit connection of 2 temperature sensors that are designed as two wall panels for the cubic "house" or as a probe to touch against surfaces. A 16 character 2 line back-lit LCD display guides the user through the steps of operation.

'STELR' SUSTAINABLE HOUSING Temp. Logger. ST300-80



The display back light is turned on by touching a button and, to conserve battery power, light is turned off if no button has been pressed for a period of 40 seconds. However, when the logger is used on 12V.power, the back light remains on permanently. Very robust design for use in the classroom by untrained students.

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**CONTROLS: The 5 buttons have the following functions**

“YES”: In answer to simple questions displayed

“NO”: In answer to simple questions displayed

“UP / DN”: Arrows for selecting a memory or for selecting the optional logging times.

“ENTER”: When a selection has been made, it must be ENTERED for processing.

“LIGHT”: Back-light press ON / press OFF. ‘Auto-off’ is no button press for 40 sec.

“ON/OFF rocker switch” Controls Logger power for both internal battery and power supply.

Alkaline battery life should be about 150 operating hours. When the battery voltage falls to below 6V, display shows “LOW BATT” but unit should continue to run for several hours from that point.

INFORMATION PROVIDED: The rear panel carries “Flow Chart” assistance for user if details are lost or forgotten. Students and teachers can work out the simple procedures themselves.

SOCKETS PROVIDED: Two RCA sockets are provided on the front panel to accept the cables to the 2x temperature sensors. Two sockets are provided on the rear of the housing. One is for the small power cable for connecting the Logger to the 12V.AC/DC power supply provided in the kit. The other socket is for the USB cable to connect the logger to any Windows computer for storing and graphing data.

CABLES PROVIDED: There is a total of 9x cables in the Sustainable Housing kit:

- 1) 1x Small power cable to connect Logger to Power Supply.
- 2) 1x Long USB cable to go to the USB port of a Windows computer.
- 3) 2x Long RCA cables for connecting 2x temperature sensors to the logger front panel.
- 4) 4x 600mm long IEC cables with banana plugs for connecting to the heater and motor & fan.
- 5) 1x Mains cable to connect to the 240 / 6V & 12V.AC Power Supply.



FUNCTION OF THE DUAL TEMPERATURE LOGGER:

Battery operation permits the Logger to be used away from the classroom for 'real world' measurements. The stored measurements can be either reviewed on the Logger's screen or downloaded to a computer for examination later.

For each logging event, the user can choose which of the 5 memories to use and each memory is able to carry 1,200 sets of data. One set of data consists of 3 columns::

Time run in hr:min:sec Temperature at sensor 1. Temperature at sensor 2.

Five memory files are available for storing time and temperature data, therefore 5 experiments can be performed before it is necessary to store to the PC (Personal Computer). If storing data is not required, any memory can be overwritten with new data.

At any time, any file can be RENAMED to become a more suitable name for the experiment.

Each of the 5 memory files can store 1200 samples with the following choices:

- for 20 minutes time at interval of 1 second
- for 40 minutes time at interval of 2 seconds
- for 60 minutes time at interval of 3 seconds
- for 5 hours time at interval of 15 seconds
- for 20 hours time at interval of 1 minute
- for 40 hours time at interval of 2 minutes

USING THE LOGGER: Fundamental steps:

The "Opening Display" asks that you decide the following:

- Either display existing data OR start logging a new experiment. Yes or No
- If you select YES, you must choose which memory to use. Press UP / DN to select memory number 1-5, then press ENTER.
- Now decide if you are "RECALLING EXISTING DATA" or not. Yes / No
- If YES is selected and If the memory number has no data, NO DATA IN SELECTED MEMORY will be displayed. If the memory number contains data, it displays showing time, memory number, sensor1 and sensor 2 temperatures.
- Press UP / DN to manually step through the data and the 'Time' display indicates when data was stored during the logging period.
- If you select NO, you are not recalling data, therefore you must be creating new data.
- Display then shows the various combinations of run time and intervals between logging a sample. Use UP / DN keys to step through the options to best suit your experiment. When the times are set. press ENTER.
- You are asked if OK to overwrite the selected memory number with new data. Yes / No.
- If you are unsure, press NO and you will be asked to select a different memory number.
- If you are sure, press YES and see the logging proceeding. To stop, press BACK.
- Display reverts back to the "Opening Display".
- This time, if you say NO, this means you are wanting to export the data on the logger to the Computer. The display will show WAITING FOR PC. EXECUTE LOG.exe"

See below for explanation of this message.

**USING THE COMPUTER: Fundamental steps:**

Normally the teacher would prepare the PC or Laptop to accept the Logger's data.

1) The first step is to connect the powered Logger to the computer with the USB cable which will require the computer to be connected to the Internet to find and install the correct driver for the USB hardware in the Logger. Different versions of Windows will display the driver "Wizard" differently. In some cases, you may need to click on "next" etc. In other cases the driver may be installed automatically. After the USB driver is installed, the Internet is not required again.

2) Take the USB stick drive provided in the Teacher's kit and insert it into another USB port of the computer. Using "MY COMPUTER", create a suitable folder in the computer perhaps named "STELR_SH" (SH = Sustainable Housing). This folder could be created on the "desktop" or some other place on the hard drive that is easy for all the students to find.

NOTE: If preferred, this folder could be created on a USB stick drive so that the whole experiment session of all the students could be unplugged and taken away from the PC or copied to another PC.

3) Inside this "STELR_SH" folder, create a separate folder for each student to contain his / her data. Maybe the folder names could be the names of each student.

4) **Then copy the "Log.exe" file from the USB stick into EACH student folder,**

IMPORTANT NOTES:

NOTE 1: When a student is ready to download data to the PC, the Logger display will be showing WAITING FOR PC. EXECUTE LOG.exe. Everything is now set for the students to download their data to the PC.

NOTE 2: When the student opens his / her folder, the "Log.exe" file must be executed by double-clicking it before download from the logger to the PC is possible. A small black "DOS" window will appear showing the details of the data transfer. Executing the "Log.exe" file sets the communication correctly from the logger's USB port to the student's folder on the PC and, after being executed with the double-click, downloading of all 5 memory files immediately can be seen on the "DOS" window from the logger to the student's folder in the PC.

NOTE 3: Providing the "DOS" window is not closed, new data can be logged and downloaded without re-executing the Log.exe file. But if the "DOS" window has been closed, the "Log.exe" file will need to be executed again.

NOTE 4: The 5 files will be initially created in the folders as "LOG1-xxx.csv" (CSV= Comma Separated Values), LOG2-xxx.csv, etc up to LOG5-xxx.csv files which are compatible with Windows EXCEL program. If any one of the CSV files is double-clicked, it will be opened automatically by Excel and the logged data will be listed in 3 columns: **H:M:S, Temp1, Temp2.**

NOTE 5: The files, when downloaded to the PC, are automatically numbered to be one larger than the previous number (up to 999) so that no saved file can overwrite any existing file in that folder. However, it is a very good idea to rename the file containing your data to a name that relates to your experiment but do NOT change the ".CSV" file extension because Excel will no longer be able to process that file.

NOTE 6: In Excel, examine the 3 columns of data or, using Excel commands, select the data to form a graphical display of the data against elapsed time of the experiment. Study as required.



QUICK AND SIMPLE TEST TO CHECK LOGGING: can be performed any time with or without data present in the memories.

- Logger powered ON either by battery or by power source.
- Opening display showing "DISPLAY OR LOG DATA ?"
- USB cable plugged into one of the computer's USB ports.
- Connect USB cable to socket on the Logger.
- First use only: Computer should be connected to the Internet. Computer recognises USB connected and searches on the Internet for the driver. Installs driver automatically.
- Later uses: Driver is already installed and Internet is not required.
- On Computer, find your folder (already installed by teacher) that is to hold your data files.
- Open folder and check that file name "LOG.exe" exists in the folder.
- On the Logger, answer the display. You do NOT want to "Display or Log", so press NO.
- Display says WAITING FOR PC. EXECUTE LOG.exe.
- On the computer, double click the file LOG.exe.
- A small black 'DOS' window should appear, that folder of the PC and the Logger are linked together and 5 files should be copied to the folder. See their names appearing on the window as they download from the Logger.

FOR PRACTICE, REPEAT THE DOWNLOADING EXERCISE AGAIN FROM THE BEGINNING.

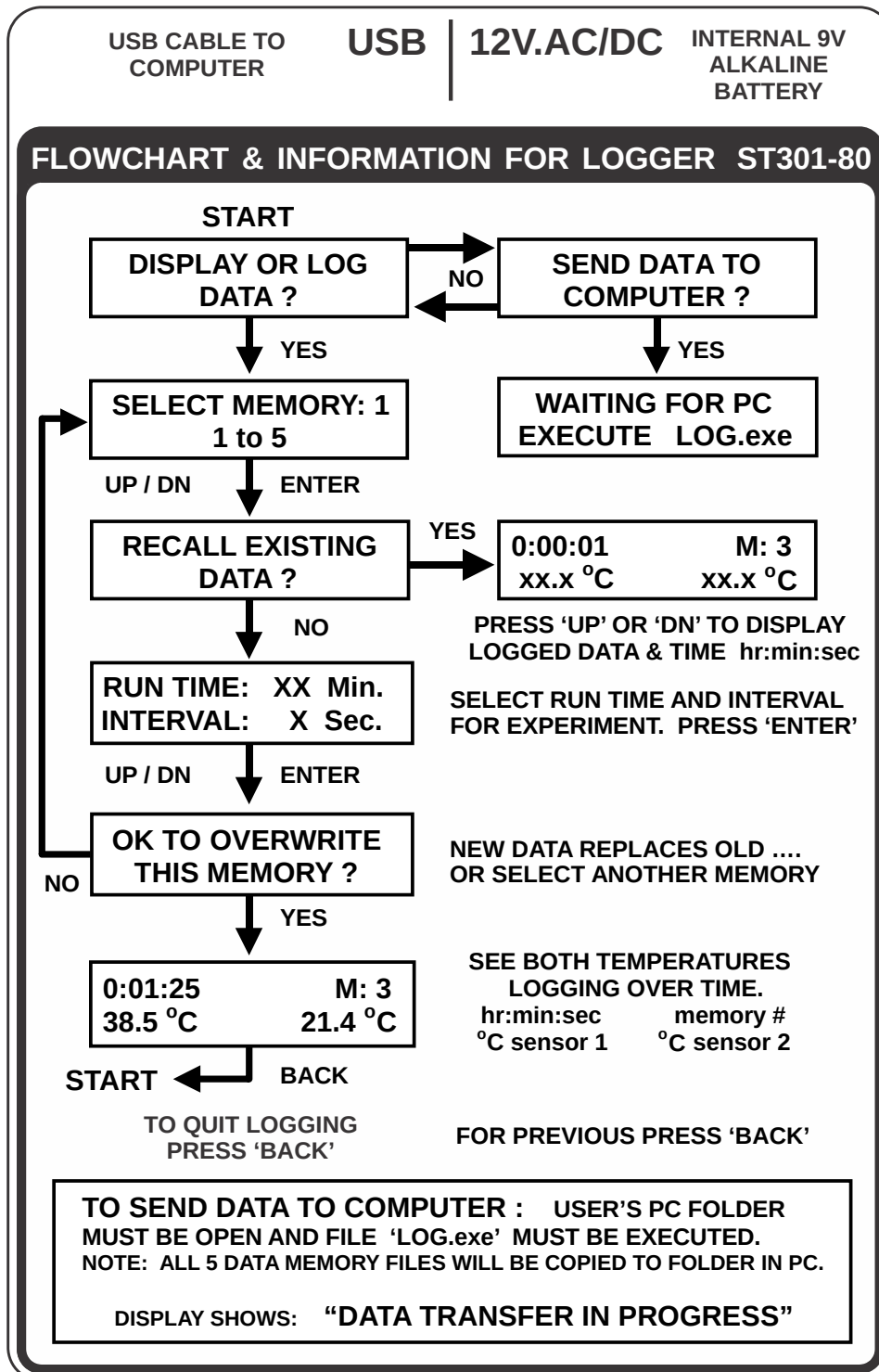
- Notice that each time files download, the file number is increased by one. Downloaded files can never write over existing files.
- Notice in the folder that a small "text file" is created that always carries the dates and file names involved in each download. Double click to execute and view this file It can be useful to check history and times of data downloads.

NOTE 1: If "DOS" window is left open, there is no need to execute "LOG.exe". If the "DOS" window is closed, the file "LOG.exe" will need to be executed again to create the "DOS" window and to trigger the download.

NOTE 2: The files all have a ".csv" ending which makes them compatible with Excel. Highlight any file and double click. See the logged data listing in 3 columns: H:M:S Temp1 Temp2.



FLOWCHART: The operation procedure and the display messages are all shown below and also on a label fixed to the rear face of each logger,





The STELR “SUSTAINABLE HOUSING” TEACHING KIT

OVERVIEW :

The content of the student kit is as follows:

<u>QTY</u>	<u>NAME</u>	<u>FUNCTION</u>
2	HOUSE CUBE. CAN 'PIGGY-BACK' TO BE A DOUBLE STOREY HOUSE OR ROOM.	Simulates a single storey or double storey house or a room with 4 walls, ceiling and floor. Various types of panels can be fitted on all sides to provide glass panels, windows, heating, partial or extreme insulation, air circulation and temperature sensing,
2	HOUSE ROOF	Fits neatly to the top of a House Cube to simulate a roof and to create a ceiling cavity for study. Can accept two of any type of panel supplied in the kit.
1	HEATING LAMP	12V AC or DC, 50 watt with reflector to throw the heat and light forward towards the roof or panels of the “house”. This globe can be replaced by a domestic 50W Halogen lamp commonly used.
1	POWER SUPPLY	240V / 12 & 6V.AC. Used for running the heating lamp, the heat panel used on the floor or motor & fan used on a “house” wall.
1	HEATING PANEL	Held to a floor or wall of a “house” by the clamp device that also provides 2x 4mm sockets for banana plugs on cables,
1	HEATER CLAMP	Used under the floor of a “house” to engage and secure the heating panel and to provide power connections.
1	MOTOR & FAN	Used as a wall panel and can be used with the motor inside or outside the “house”. Powered from the power supply 6 or 12V
1	DATA LOGGER	Please read the separate section for information on using this dual temperature digital Logger.
2	°C SENSE PANELS	Used as wall panels to be placed anywhere around a “house” cube and roof. Can be used as a high sensor or low sensor or half way up the height of the “House”.
1	°C SENSE PROBE	Used instead of a sensing panel to enter into small spaces or to make contact with an item to measure surface temperatures.
1	CABLE - MAINS	For connecting the Power Supply to mains power.
1	CABLE – 12V PWR.	For connecting the Logger to the Power Supply.
1	CABLE - USB	For connecting the Logger to a Computer.
2	CABLE – RCA	For connecting 2x temperature sensors to the Logger.
4	CABLE – 4mm BANANA PLUGS	For connecting the heater panel and the motor & fan to the Power Supply.



The contents of the student kit continued:

<u>QTY</u>	<u>NAME</u>	<u>FUNCTION</u>
2	OPEN FRAME PANELS	For making one's own panels using foils or cloth or other materials which will stretch over or seal to the frames.
8	CLOSED PANELS	Used on the "house" cube as a partially insulating panel.
8	INSULATION PANELS	Used on the "house" cube as a totally insulating panel.
4	CLEAR WINDOWS	Used on the house individually, or back to back as double thickness "glass". Or can be used front to front leaving a dead air cavity between them for simulating "double glazing".

The content of the teacher kit is as follows:

2	GLASS PANELS PLAIN CLEAR	6mm thick glass to be used anywhere around the "house" cube or roof. This is plain clear glass with no special features.
2	GLASS PANELS LOW"E"	6mm thick glass with special heat rejection features.
2	GLASS PANEL GREY	6mm thick glass tinted grey to reduce heat and glare.
8	WOOD PANELS	3mm thick wood panels used as insulation anywhere around the "house" cube or roof. Can be compared with other panels.
2	TERRA COTTA TILES AS PASSIVE HEAT RESERVOIR	6mm thick Terra Cotta can be used as a pre-heated passive heating material where the pre heated panel is placed in the "house" cube and the retained heat used to warm the "house".
2	STEEL PANEL AS PASSIVE HEATER	Panel is heated and used in the "house" cube for the retained heat to warm the "house". Comparisons between the materials.
2	ALUMINIUM PANEL AS PASSIVE HEATER	Panel is heated and used in the "house" cube for the retained heat to warm the "house". Comparisons between the materials.
12	METAL PANELS	Assortment of 6 different metal panels to use in the walls or roof of the "house" cube. Some panels have special coatings to provide special insulation or reflective features
1	MEMORY STICK	.CONTAINING A SPECIAL FILE FOR SETTING UP FOLDERS ON A COMPUTER FOR DATA UNDER STUDENTS' NAMES. ALSO CONTAINS FILES OF "STELR" INFORMATION FOR VARIOUS EXPERIMENTS

Designed and Manufactured in Australia