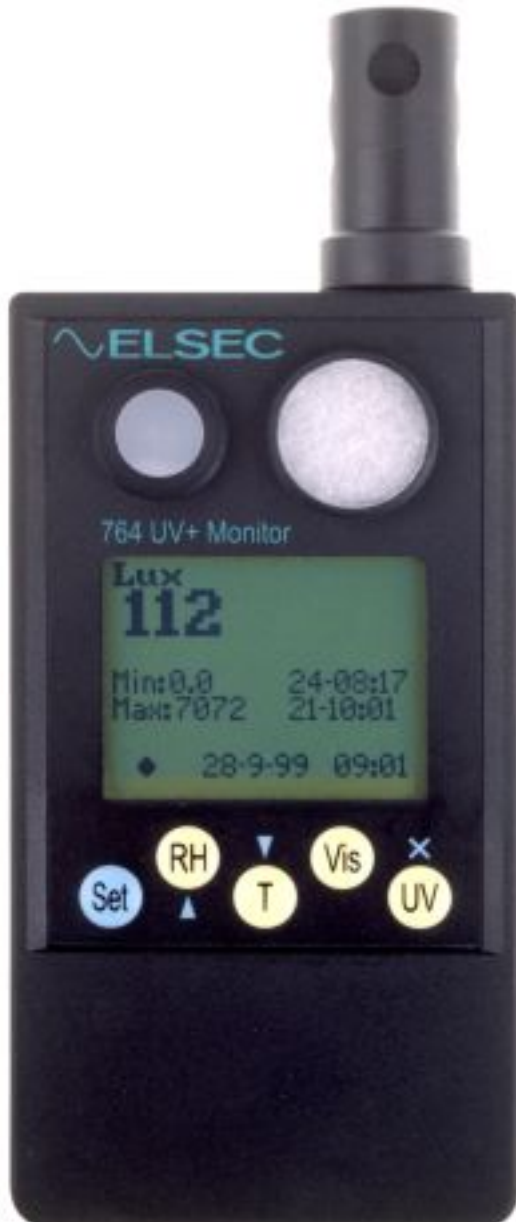


ENVIRONMENTAL MONITOR & DATA LOGGER

Type 764

LITTLEMORE SCIENTIFIC ENGINEERING

~ELSEC



- *Replaces 4 separate instruments*
- *Ultra Violet (UV) level*
- *Visible Light (Lux or Foot-candles)*
- *% Relative Humidity*
- *Dew point*
- *Temperature (°C or °F)*
- *Sized like a small mobile phone*
- *Easy one handed operation*
- *Large, easy to read display*
- *Maximum & minimum with time*
- *Optional data logging*
- *Selected by the Design Council as a Millennium Product*

PRODUCTS
MILLENNIUM

This single instrument enables measurement of the four parameters that cause most damage to buildings, valuable objects, documents etc: ultra-violet and visible radiation, humidity and temperature.

For many years it has been recognised that one of the major causes of damage to museum objects and other antiquities is the fading and rotting effect of light on the object. The most damaging part of the illumination is its ultraviolet (UV) content. Since 1976 Littlemore Scientific (ELSEC) has been providing instruments that enable the conservator to measure the UV content of light and thereby protect valuable exhibits. Using the 764, measurements can be taken of the proportion of UV present (mW/lumen), the total amount of UV (mW/M²), the amount of visible light present as Lux or Foot-candles. Temperature can be measured in °C or °F, humidity is shown as % Relative Humidity (%RH) and dew point. The displayed units can easily be changed by the user.

Provision is made for user calibration of the RH sensor using saturated salt solutions. A calibration kit is available as an optional extra.

Maximum and minimum values and their time of measurement are displayed for each parameter.

Much trouble has been taken to make the 764 as easy to use as possible. Anyone can take measurements straight out of the box with little, if any, reference to the instruction manual. The appropriate button is pushed depending on the measurement required and the reading is taken. The unit automatically turns off 10 seconds after the last reading unless a button is held down for over 5 seconds, this causes continuous measurements to be taken until another button is pressed. The large 8 line display enables an easy to use menu system to select the more advanced functions, change units etc. [Click here for more information on displays and menus.](#)

Data Logging

The optional data-logging function enables over 10,000 readings of all four parameters to be automatically taken at selectable intervals (every 10 seconds to 1 hour). The saved data can then be transferred to a computer by a wireless infra-red link (IrDA compatible). Many modern computers have an infra-red interface built in; for those that do not, adapters are available. When logging data the 764 can be turned off to save power and the built in clock will turn the unit on whenever a reading needs to be taken, this enables a 764 to be left taking readings for months at a time. Software is provided to save the logged data in a CSV format that can be accessed and displayed by many programs (e.g. Microsoft Excel). A separate program allows the graphical display of the data. [Click here for more information on logging software.](#)

Units of measurement for UV

Traditionally UV has been measured in museums as the proportion of ultraviolet present. This result is useful for checking a particular lamp or window because the proportion of UV does not change with the distance from the light source. Using a simple rule, the amount of UV on an object can be limited (it is usual to arrange that the proportion of UV should not exceed 75mW/lumen in museums). The actual amount of damage done is determined by the total amount of UV falling on the object, so it is useful to be able to measure this directly, especially if non standard amounts of illumination are required. The amount of UV should be as little as possible but in general should not exceed 20mW/M².

A Lux readout is provided to control illumination and limit damage done by visible light. Normal museum light levels should be limited to 150-250 Lux.



SPECIFICATIONS

Method of radiation detection	Twin silicon photodiodes connected to single chip microprocessor
Visible wavelength range	400-700nm (CIE response). No correction required for different light sources
Visible power range	0.1 - 200,000 Lux (0.1 – 20,000 Foot-candles)
UV wavelength range	300-400 nm
UV power range	2 - 50,000 mW/sqM
UV proportion range	0 - 10,000 μ W/Lumen

RH sensor	Capacitive film type
RH range	0-100%RH
Display resolution	Lux: 0.1 up to 100 then 1 Foot-candles: 0.1 up to 100 then 1 UV: 0.1 up to 100 then 1 Proportion of UV: 1 μ W/Lumen Temperature: 0.1° C or ° F RH: 0.1
Accuracy	Light: 5% \pm 1 displayed digit UV: 15% \pm 1 displayed digit Temperature: \pm 0.5° C (\pm 0.9° F) RH: \pm 2.5%
Angular response (Light & UV)	Cosine
Readout	8 line graphical Liquid Crystal Display with automatic backlight
Data logging time intervals (Time till full)	10 seconds (30 hours), 1 minute (7½ days) , 10 minutes (75 days), 1 hour (454 days)
Data logging storage capacity	10,900 readings of all 4 parameters
Storage resolution for logged data	Light & UV: 0.1% of saved value Temperature: 0.5°C Humidity: 0.5%RH
Computer Interface	IrDA compatible wireless infrared link
Date function	Display as day-month-year or month-day-year. Fully Year 2000 compliant
Batteries	2 off alkaline AA type
Battery Life	Approx 100 Hours continuous use or 12,000 readings taking 30 seconds each. Battery life will be less if the display backlight is used
External Power Supply (If available)	4.0-5.2V DC, 100mA A suitable mains power supply can be provided as an optional extra (please specify mains voltage required).
Operating Temperature	0-50°

Dimensions	150 x 65 x 25mm 5.9 x 2.5 x 1 inches Including RH/Temperature probe
Weight	165g (5.6 oz) with batteries.

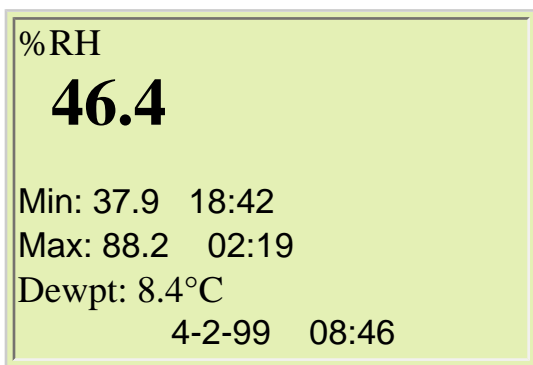
LITTLEMORE SCIENTIFIC ENGINEERING



Environmental Monitor & Data Logger Type 764

Typical Displays

If the RH button is pressed the 764 will show the % relative humidity and dew point:



The maximum and minimum humidities that have been seen are shown along with the times that they were measured. It is possible to display the dates of the maxima and minima.

The dewpoint temperature is shown, this can be in °F if required.

The current date and time are displayed on the bottom line. The date format can either be day-month-year or month-day-year.

The following procedure to change the temperature units demonstrates the simple to use menu structure:

Press the **Set** button to display the following menu:

A screenshot of the device's menu. The background is light green. The text is black. The first option is 'Max-Min' and the second option is 'Data logging'.

Max-Min
Data logging

Display
Units
Clock
Calibrate

Push the down-arrow button until the Units menu item is selected:

Max-Min
Data logging
Display
Units
Clock
Calibrate

Press the **Set** key to get the Units menu:

°C-°F
Lux-Footcandle
μW/Lumen-mW/M²

The °C-°F menu item is already selected so the **Set** button can be pressed to change the temperature units. This new setting remains in force even when the 764 has been turned off.

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Software for use with the 764 Environmental Monitor

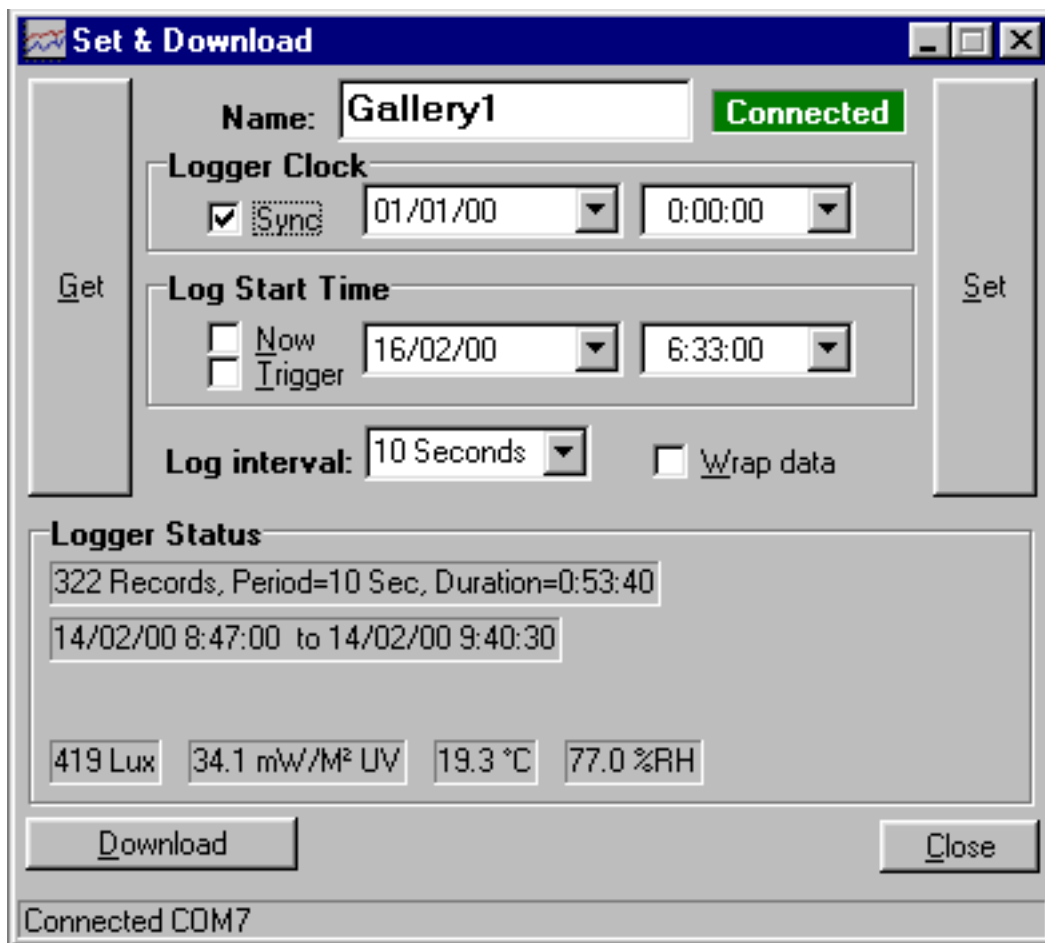
The RView program is provided for PC compatible computers running Windows 95 or 98

Functions:

- Program logger start time, logging interval etc
- Download the logged data to the PC
- Display the logged data as graphs, tables etc

Program the Logger

Aim the logger at the PC infrared port and open the Set & Download window (one click in RView):

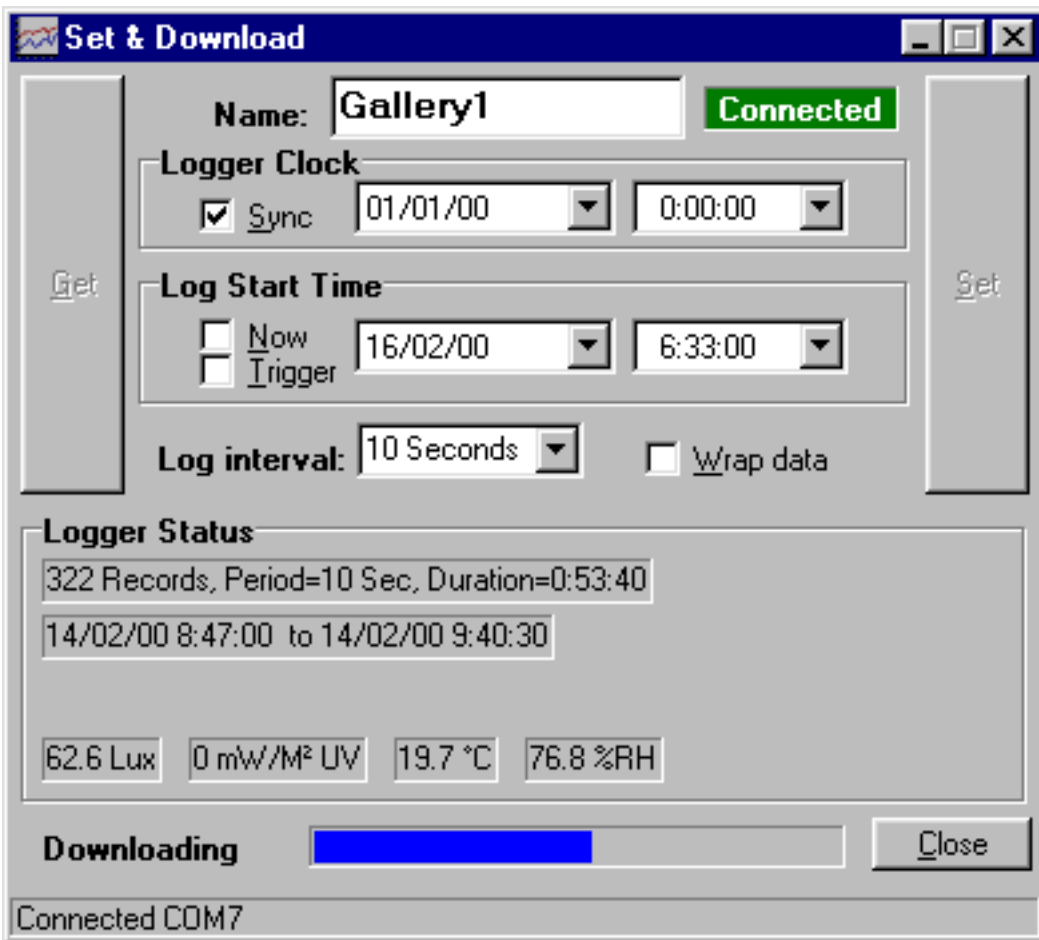


The current logger settings can be viewed by pressing the Get button or the logger can be programmed by filling in the form and pressing the Set button.

"Logger Status" shows the data the logger has now.

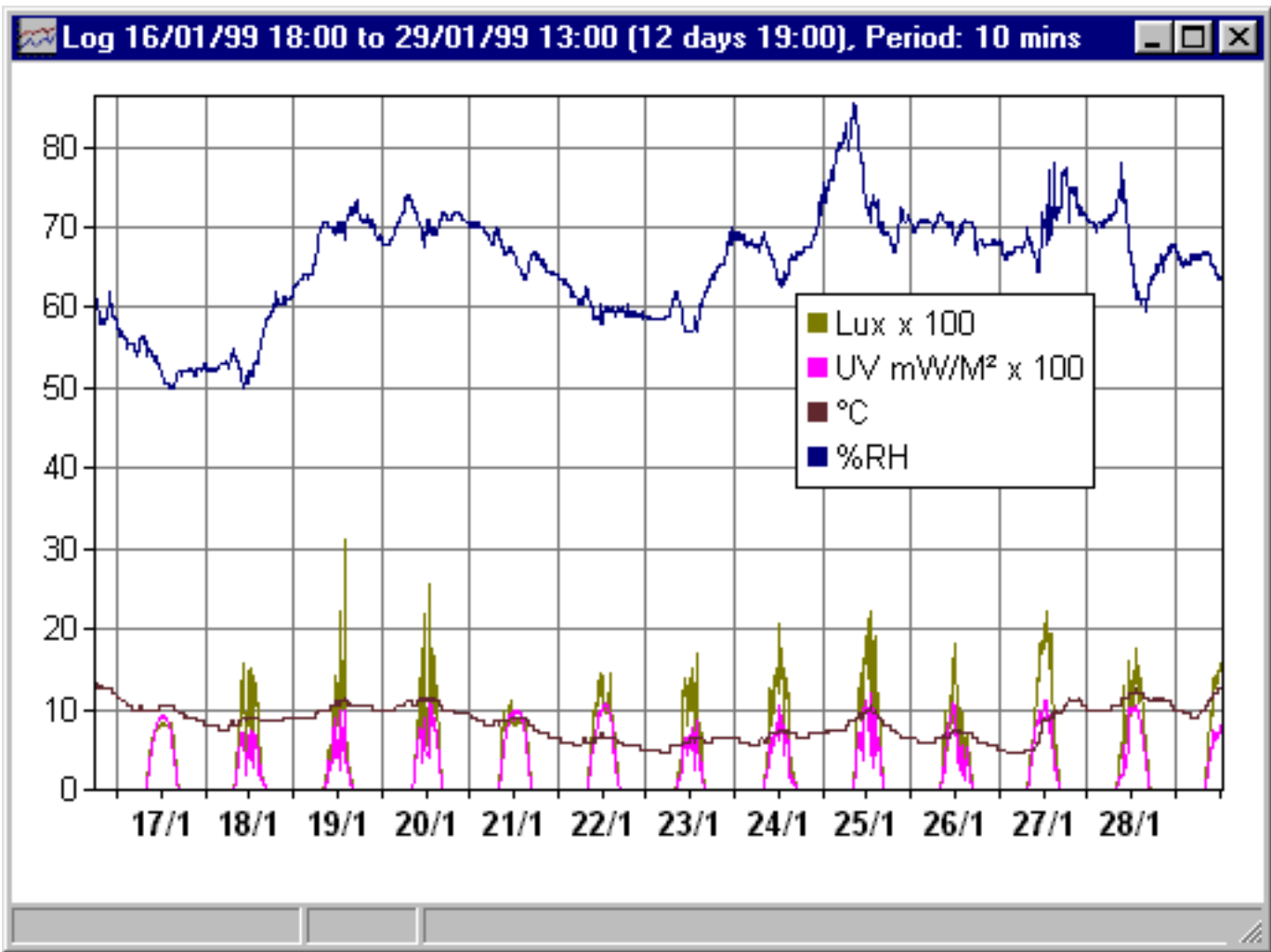
Download data

Press the Download button to transfer data form the logger to the PC:

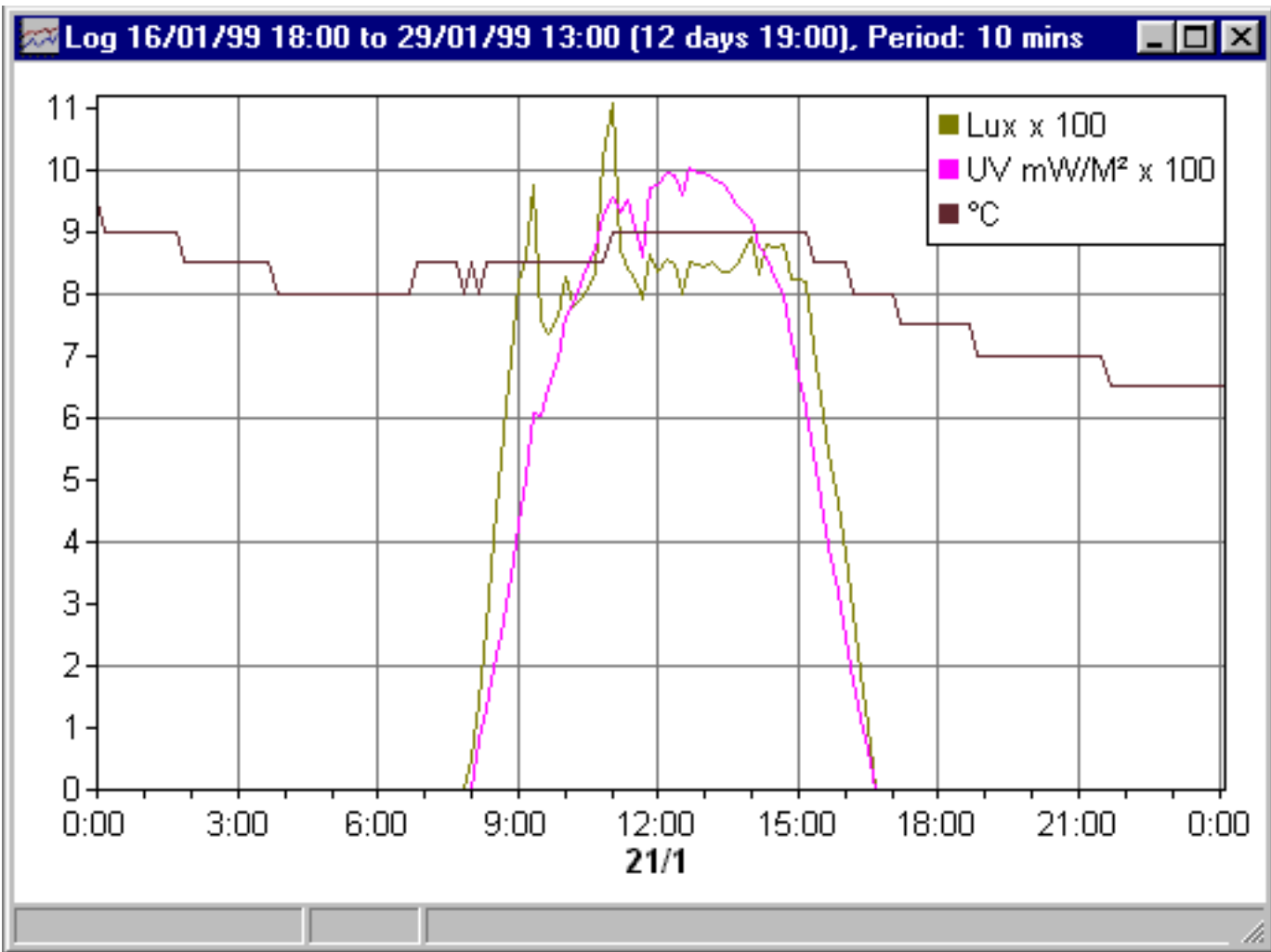


View the Data

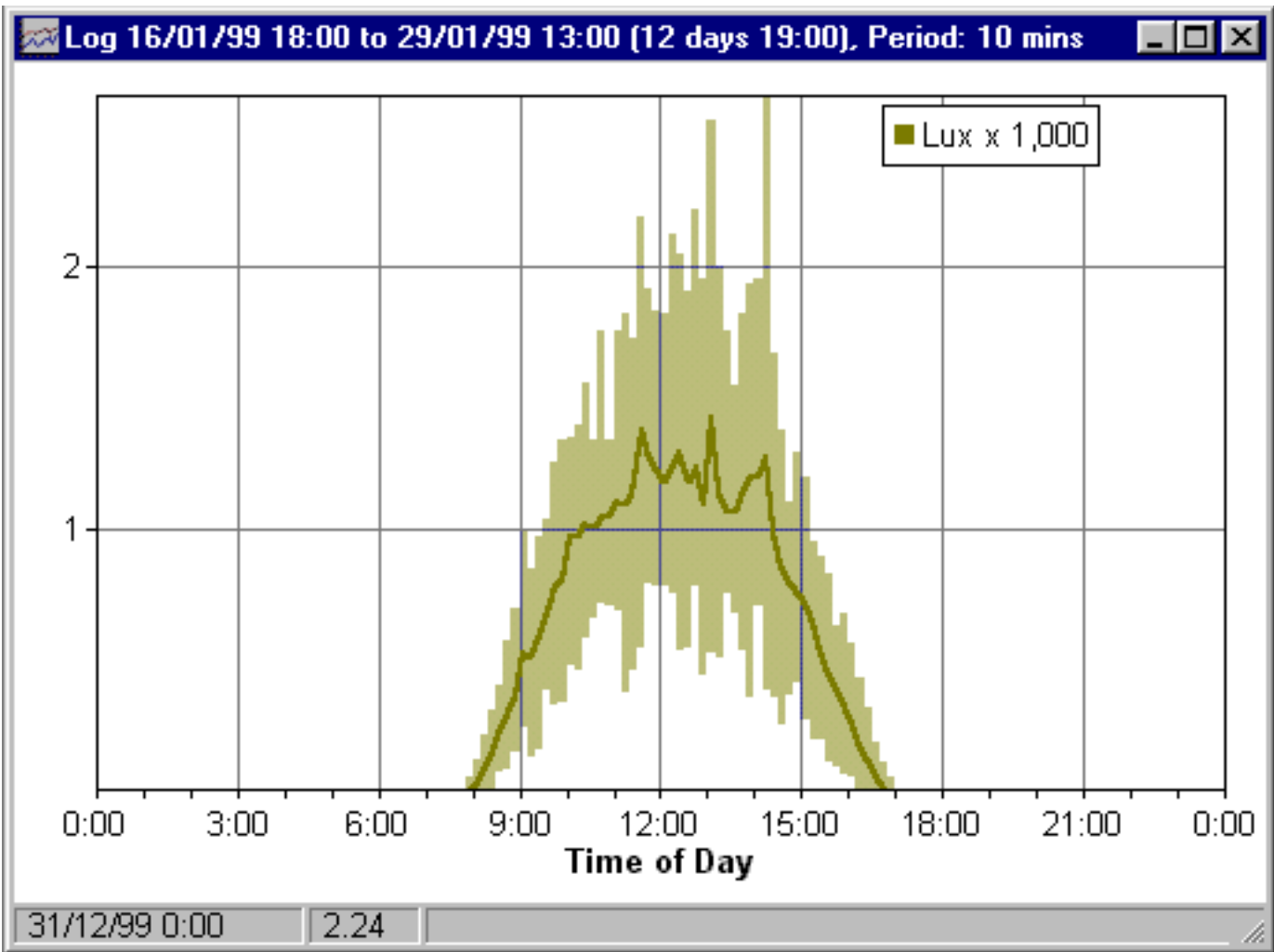
Once the data is stored on the PC it is easily displayed using RView. When a data file is opened a typical view is as follows:



The graph is automatically scaled to show all the data but it is possible to show different units and zoom in on part of the data, for example:



The data can be analysed in various ways, for example the following graph shows the mean lux level and max/min by time of day:



Data can also be shown as raw text:

Log 16/01/99 18:00 to 29/01/99 13:00 (12 days 19:00), Period...						
	Lux	UV mW/M ²	UV μ W/Lm	°C	%RH	Dew point °C
17/01/99 10:00	679	681	1003	10.0	54.0	1.13
17/01/99 10:10	703	719	1023	10.0	53.5	1.01
17/01/99 10:20	719	752	1046	10.0	53.5	1.01
17/01/99 10:30	730	780	1068	10.0	54.0	1.13
17/01/99 10:40	740	804	1087	10.0	54.0	1.13
17/01/99 10:50	752	825	1097	10.0	53.5	1.01
17/01/99 11:00	761	844	1110	10.0	53.0	0.88
17/01/99 11:10	771	861	1117	10.0	53.0	0.88
17/01/99 11:20	778	876	1125	10.0	53.0	0.88
17/01/99 11:30	790	888	1124	10.5	52.5	1.21
17/01/99 11:40	794	899	1133	10.5	52.5	1.21
17/01/99 11:50	805	909	1129	10.5	52.0	1.07
17/01/99 12:00	812	917	1130	10.5	51.5	0.94
17/01/99 12:10	820	922	1124	10.5	51.5	0.94
17/01/99 12:20	824	924	1122	10.5	51.5	0.94
17/01/99 12:30	822	924	1123	10.5	51.0	0.81
17/01/99 12:40	815	920	1129	10.5	50.5	0.67
17/01/99 12:50	807	915	1134	10.5	51.0	0.81

The graphs can be printed or copied to the clipboard for use in word processed documents etc.

UNIVERSAL LIGHT MONITOR & DATA LOGGER

Type 774

LITTLEMORE SCIENTIFIC ENGINEERING

VELSEC



- Replaces 4 separate instruments
- Thermal Radiation (IR)
- Ultra Violet (UV) level
- Visible Light (Lux or Foot-candles)
- Temperature (°C or °F)
- Sized like a small mobile phone
- Easy one handed operation
- Large, easy to read display
- Maximum & minimum with time
- Optional data logging

A single instrument enables measurement of the three types of radiation that are of most interest: visible (Lux), thermal radiation and ultraviolet. The 774 also measures temperature in °C or °F.

Thermal Radiation (IR)

The measurement of thermal radiation (shown as W/M² or btu/hour/ft²) allows the user to estimate how much solar heat is coming through windows, check the performance of heat reflecting films, measure the heating effect of lamps on objects etc

Visible Light

The amount of visible light is important, not only to check illumination in work areas, galleries etc but also to control damage to light sensitive objects that is also caused by normal light. Measurements can be displayed as Lux or Foot-candles.

Ultraviolet (UV)

For many years it has been recognised that one of the major causes of damage to museum objects and other sensitive objects, soft furnishings etc is the fading and rotting effect of light on the object. The most damaging part of the illumination is its ultraviolet content. Since 1976 Littlemore Scientific (ELSEC) has been providing instruments that enable the conservator to measure the UV content of light and thereby protect valuable exhibits. Using the 774, measurements can be taken of the proportion of UV present (mW/lumen), the total amount of UV (mW/M²)

Data Logging

The optional data-logging function enables over 10,000 readings of all four parameters to be automatically taken at selectable intervals (every 10 seconds to 1 hour). The saved data can then be transferred to a computer by a wireless infra-red link (IrDA compatible). Many modern computers have an infra-red interface built in; for those that do not, adapters are available. When logging data the 774 can be turned off to save power and the built in clock will turn the unit on whenever a reading needs to be taken, this enables a 774 to be left taking readings for months at a time. Software is provided to display the measurements and save the logged data in CSV format that can be accessed and displayed by many programs (e.g. Microsoft Excel).

Easy to use

Much trouble has been taken to make the 774 as easy to use as possible. Anyone can take measurements straight out of the box with little, if any, reference to the instruction manual. The appropriate button is pushed depending on the measurement required and the reading is taken. The unit automatically turns off 10 seconds after the last reading unless a button is held down for over 5 seconds, this causes continuous measurements to be taken until another button is pressed. The large 8 line display enables an easy to use menu system to select the

more advanced functions, change units etc.

Units of measurement for UV

Traditionally UV has been measured in museums as the proportion of ultraviolet present. This result is useful for checking a particular lamp or window because the proportion of UV does not change with the distance from the light source. Using a simple rule, the amount of UV on an object can be limited (it is usual to arrange that the proportion of UV should not exceed 75mW/lumen in museums). The damage is done by the total amount of UV falling on the object, so it is useful to be able to measure this directly, especially if non standard amounts of illumination are required. The amount of UV should be as little as possible but in general should not exceed 20mW/M².

SPECIFICATIONS

Visible wavelength range	400-700nm (CIE response). No correction required for different light sources.
Visible power range	0.1 - 200,000 Lux (0.1 - 20,000 Foot-candles)
UV wavelength range	300 - 400 nm
UV power range	2 - 50,000 mW/M ²
UV proportion range	0 - 10,000 mW/Lumen
Thermal radiation sensor	Bismuth/Antimony thermopile with KBr window
IR/Thermal wavelength range	350nm - ~40µM
Thermal radiation range	0-1000 W/M ²
Display resolution	Lux: 0.1 up to 100 then 1 Foot-candles: 0.1 up to 100 then 1 UV: 0.1 up to 100 then 1 Proportion of UV: 1 mW/Lumen Temperature: 0.1°C or °FIR: 0.1 up to 100 then 1
Accuracy	Visible: 5% ±1 displayed digit IR: 5% ±10W/M ² UV: 15% ±1 displayed digit Temperature: ±0.5°C (±0.9°F)
Angular response (Light, UV & IR)	Cosine
Readout	8 line graphical Liquid Crystal Display with automatic backlight

Data logging time intervals(Time till full)	10 seconds (30 hours), 1 minute (7½ days) , 10 minutes (75 days),1 hour (454 days)
Data logging storage capacity	10,900 readings of all 4 parameters
Computer Interface	IrDA compatible wireless infra-red link.
Date functions	Display as day-month-year or month-day-year. Fully Year 2000 compliant.
Batteries	2 off alkaline AA type.
Battery Life	Approx 100 Hours continuous use or 12,000 readings taking 30 seconds each. Battery life will be less if the display backlight is used
External Power Supply(If available)	4.0-5.2V DC, 100mA A connection for an external supply is provided to special order at extra cost.
Operating Temperature	0-50°C
Dimensions	150 x 65 x 25mm 5.9 x 2.5 x 1 inches Including IR/ Temperature probe
Weight	165g (5.6 oz) with batteries.