

**LASER MODULE**

**MEDI-LINK**

**MODEL 87**

**CE 0120**

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# General Information

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This manual provides the necessary information for the installation and operation of the Laser Module.

These instructions must be studied before putting the module into operation.

The output of this module could prove to be hazardous to both patient and operator if used contrary to the best physiotherapy practices.

The information contained in this manual is subject to change without notice.

No part of this manual may be photocopied, reproduced, or translated into another language without the prior written consent of EMS Physio Ltd

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## Record of Amendments

### Laser Module Model 87

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ISSUE	COMMENTS	DATE
1	Initial Issue	12-11-1997
2	Amended	04-12-1997
3	Revised	02-06-1998
4	60 Diode Cluster Added	23-06-1999
5	ML9825 Added	21-02-2001
6	Revised	17-02-2005
7	Safety Goggles amended	07-06-2005
8	Revised	01-10-2007



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# Warranty

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This EMS Physio Ltd (hereinafter called the company) product is warranted against defects in materials and workmanship for a period of two years from the date of shipment. The Company will, at its option, repair or replace components which prove to be defective during the warranty period, provided that the repairs or replacements are carried out by the Company or its approved agents.

The Company will consider itself responsible for the effects on safety, reliability and performance of the product:-

only if assembly operations, re-adjustments, modifications or repairs are carried out by persons authorised by it,

only if the product is used in accordance with the instructions for use,

only if the electrical installation of the relevant room complies with the appropriate national requirements.

Should the product be returned to the Company for repair it must be sent carriage paid.

Consumable items, for example, self-adhesive electrodes, sponge electrode covers and batteries, are excluded from the above warranty.

# Introduction

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The word 'LASER' is an acronym for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation. The first laser was demonstrated in 1960 and used a ruby as the lasing medium. Lasers have been used in many applications from surgery to bar-code readers at supermarket check-outs, from missile guidance systems to CD players. The first medical application was in the treatment of a detached retina. Laser therapy became a popular modality during the 1980s.

Lasers are divided into classes (1, 2 3A, 3B and 4) according to the degree of potential hazard they present. Class 1 devices are considered to be safe and no special precautions need to be taken when using them. Class 1 devices include, bar-code readers, CD players and laser pointers. Class 4 devices are the most hazardous and require strict safety procedures to ensure their safe use. Such devices include surgical lasers. Most therapeutic lasers are class 3B devices. Viewing the laser beam directly from these devices may be hazardous but diffuse reflections are normally safe.

The Medi-Link Laser module is a low-level laser therapy (LLLT) or low-intensity laser therapy (LILT) device. The laser module uses probes which have semiconductor laser or led light sources. Unlike conventional lasers, semiconductor lasers produce a beam of coherent, monochromatic light which is not collimated but divergent. This means that the optical intensity of the beam emitted by the Medi-Link laser probe (and led probes) has reduced to a non-hazardous level just a few centimetres from the laser aperture of the probe. The intensity during treatment incident upon the treatment area is still high as the probe is used either in contact with the patient or only separated by a few millimetres. It is, however, still recommended that protective eyewear is worn during treatment.

Note that it is a requirement of EN 60825-1: Safety of Laser Products, Part 1. Equipment classification, requirements and user's guide, that for installations where class 3B devices are used, a Laser Safety Officer (or Laser Protection Advisor) should be appointed. It is the laser safety officer's responsibility to review and designate appropriate controls for the use of the equipment.

The publication, "Guidance on the safe use of lasers in medical and dental practice" (ISBN 1 85839 488 0) can be obtained from the Medicines and Healthcare Products Regulatory Agency (MHRA).

# Precautions

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The Medi-Link Laser module can only be operated after first entering a valid user access code (software key). After using the Laser module, return to the Medi-Link System Menu to prevent unauthorised use of the module. Never leave the unit with the Laser module selected.

A remote interlock connection is provided via the Multi-Function Box. When a 1/4 inch (6.35 mm) jack plug is inserted in the socket, the laser output can only be enabled when there is electrical continuity between the two poles of the connector.

Both therapist and patient should always use suitable protective eyewear during treatment. Eyewear should have an optical density of at least 2.0 for infrared radiation (905 nm and 950 nm). Suitable eyewear can be obtained from EMS Physio Ltd.

Do not stare into the beam from any of the probes, either infrared or visible.

**Caution** - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

# Contraindications

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**Eyes**, Class 3B lasers pose a significant ocular hazard. Never treat the eye or areas near the eyes. Safety goggles should be worn by both patient and therapist during treatment.

**Pregnancy**, treatment over the pregnant uterus as laser therapy could affect rapidly dividing cells

**Tumours** as laser therapy affects tissue repair and could therefore encourage growth

**Infections**, due the risk of spreading the infection

**Radiotherapy**, sites that have received radiotherapy treatment during the last six months

**Thrombosis** and impaired circulation.

**Areas of impaired sensation**

**Haemorrhage**, due to the risk of increased bleeding, including recently controlled bleeding and haematoma.

**Haemophilia**

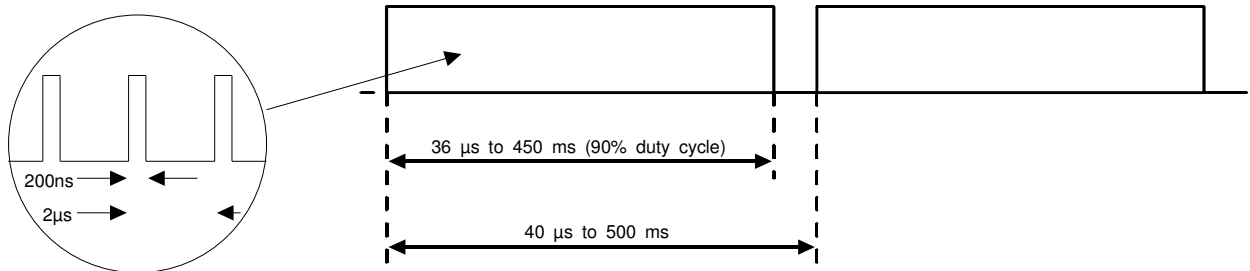
# Technical Specification

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## Laser Module

Frequency	2 Hz to 25 kHz
Timer	0 to 10 minutes
Energy	Display / set total energy in Joules
Skin Conductance	Trigger point location (treatment linked)
Treatment Programs	16 User definable set-ups
Probes	Suitable for all probes listed below
Classification (IEC 601.1)	Class 1, Type BF
Size	210 x 80 x 100 mm
Weight	1 kg

Infrared Laser probes	ML9820	ML9825
Output Power (average)	100 mW	100 mW
Wavelength	850 nm	905 nm
Duty cycle	9%	9%
Nominal Ocular Hazard Distance	200 mm	320 mm
Beam Divergence	12 x 30 degrees	5 x 22.5 degrees
Pulse Duration	200 ns	200 ns



PULSE WAVEFORM (100mW LASER PROBE ONLY)

**Visible LED probe**

Output Power (average)	10 mW
Wavelength	640 nm
Duty cycle	90%
Nominal Ocular Hazard Distance	300 mm
Beam Divergence	8 degrees
Pulse Duration	36 $\mu$ s to 450 ms

**19 Diode Cluster probe**

Output Power (average)	9 x 10 mW (visible) & 10 x 15 mW (infrared)
Wavelength	640 nm & 950 nm
Duty cycle	90%
Nominal Ocular Hazard Distance	800 mm
Beam Divergence	8 degrees (visible) and 17 degrees (infrared)
Pulse Duration	36 $\mu$ s to 450 ms

**60 Diode Cluster probe**

Output Power (average)	32 x 10 mW (visible) & 28 x 15 mW (infrared)
Wavelength	640 nm & 950 nm
Duty cycle	90%
Nominal Ocular Hazard Distance	1.5 m
Beam Divergence	8 degrees (visible) and 17 degrees (infrared)
Pulse Duration	36 $\mu$ s to 450 ms

## **Multi-Function Box**

When connected to either output socket, provides remote interlock connection, reference electrode socket for skin conductance and output power metering.

The Laser module is designed for use only as part of a Medi-Link system.

All information on model, serial number, and month/year of manufacture is located on the rear panel.

Each Laser module is supplied with a reference electrode and leads, a laser warning sign and this manual. The module may be supplied with one or more probes.

The Medi-Link Laser Module and probes have been designed to meet the requirements of IEC 601-1:1988 (BS5724:Part 1:1989) "Medical Electrical Equipment, Part 1:General requirements for Safety", and EN 60601-2-22:1996 (BS5724:Section 2.22:1996) "Specification for diagnostic and therapeutic laser equipment".

# Installation

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1. Turn OFF the Medi-Link system and remove the mains cable.
2. If fitted remove the carrying handle from the system. This is done by pushing the release button on the handle away from the system and pulling the handle upwards until it disengages from the three fixings on the right of the system.
3. Place the Laser Module next to the Medi-Link system on a flat surface.
4. Push in the button on the front of the Laser Module and slide the module onto the three fixings on the end of the Medi-Link system.
5. When in position release the button and the module should latch onto the system. If this does not occur, pressing the modules together should result in the latching action. Although the modules may simply be pressed together, use of the release button is recommended.
6. **DO NOT** attempt to add or remove a module when the system is on.
7. Connect the mains cable to the socket on the rear of the Control Module, release and position the display, and switch on the Medi-Link system.
8. The system will display the EMS logo, Company name and MEDI-LINK followed by the message "Checking system configuration" (see figure 1). The Medi-Link will detect the presence of the Laser Module, give a short beep and display the messages "Configuration has changed" and "Loading application programs". The Medi-Link will then take between 15 and 45 seconds to re-configure itself and load the new application.
9. On successfully loading the application programs the display will show the System Menu screen (see figure 2).
10. Note that the next time the system is switched on there will be no need for the Medi-Link system to re-load the application programs. On switching on the display will show the EMS logo, Company name, MEDI-LINK and the "Checking system configuration" message for approximately 2 seconds followed by the System Menu.



**Electro-Medical Supplies  
(Greenham) Ltd.**

# **MEDI-LINK**

**Checking system configuration**

Figure 1 - Logos and Company name

<b>SYSTEM MENU</b>	
<b>1 ULTRASOUND</b>	<b>19 Oct 97</b>
<b>2 LASER</b>	<b>12:29:59</b>
<b>SYSTEM SET-UP</b>	
<b>HELP</b>	

Figure 2 - System Menu

# Controls and Markings

All settings for the Laser Module are input from the Medi-Link Control Module. The output frequency may also be set using the Frequency Control located at the top of the module (see figure 3).

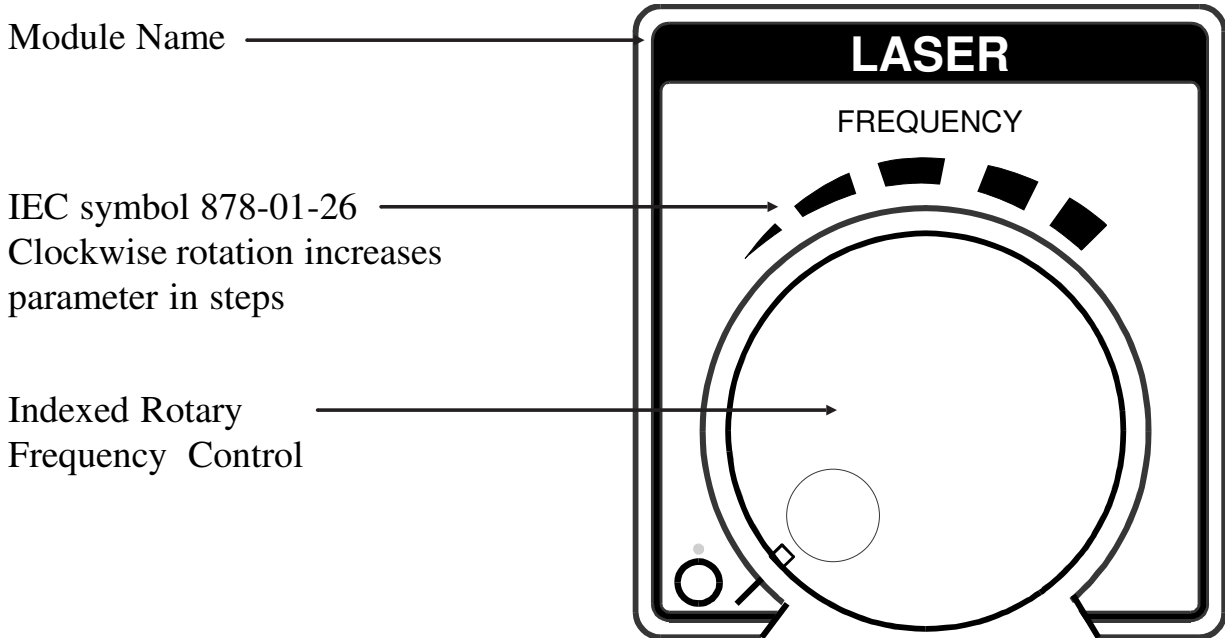


Figure 3 - Frequency Control

There are 2 sockets on the front panel of the module, labelled A and B, for connection of the laser probes. Any laser probe specified as for use with Model 87 can be connected to either socket. Beneath each socket is an indicator light showing when each socket is active (see figure 5).

Model number, serial number and date of manufacture are located on the rear of the module (see figure 6).

On the top of the module are the laser warning labels according to BS EN 60825-1:1994 (see figure 4).



Figure 4 - Laser Warning Labels

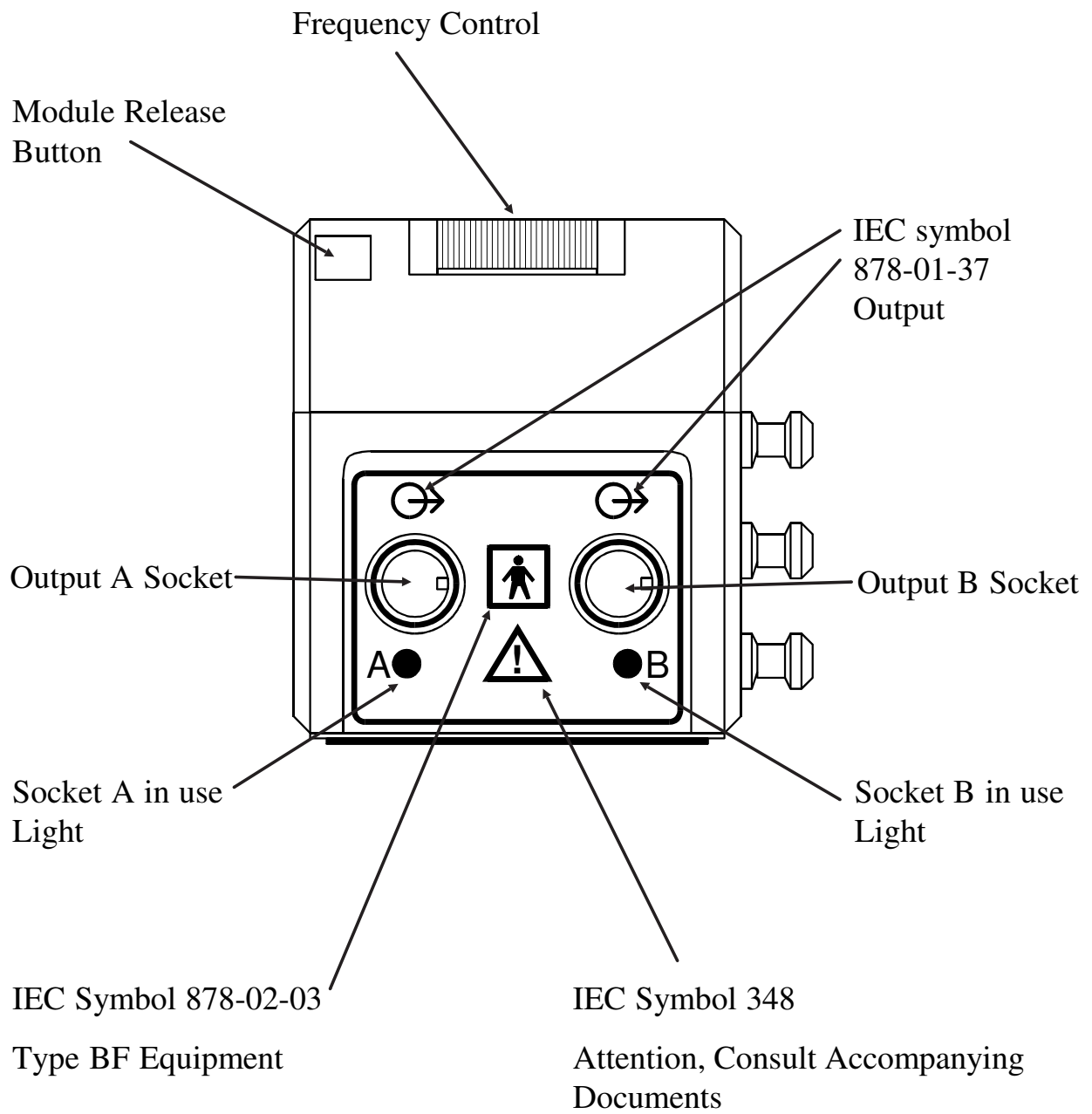


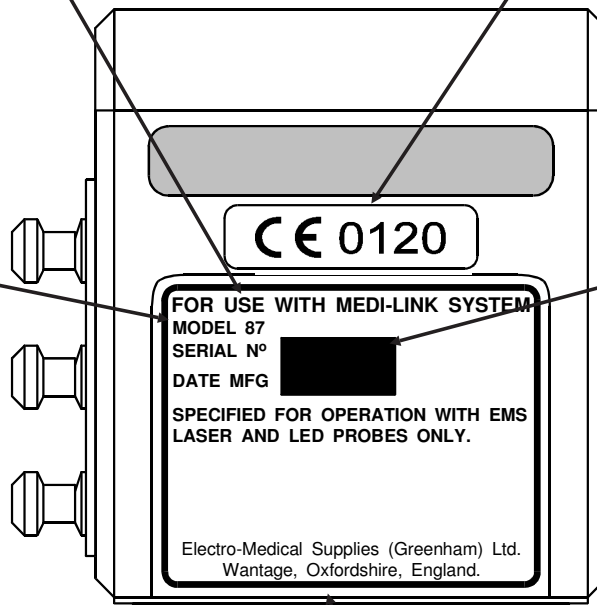
Figure 5 - Laser Module Front View

Statement indicating that the module is only for use as part of a Medi-Link system

CE Mark showing conformity to 93/42/EEC

Model Number

Serial Number and Date of Manufacture



Name and Address of Manufacturer

Figure 6 - Laser Module Rear View

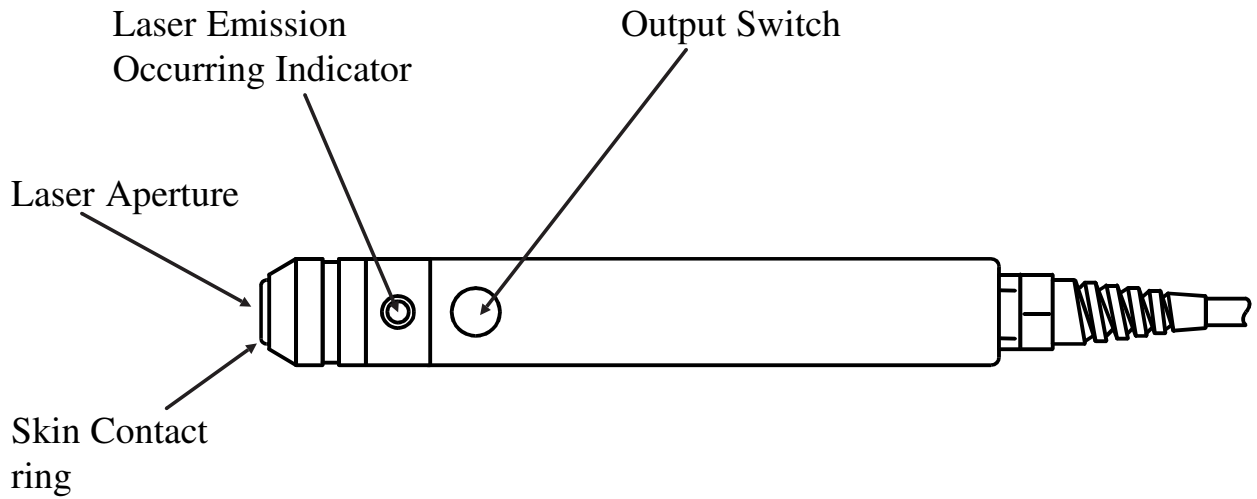


Figure 7 - 100 mW Laser Probe

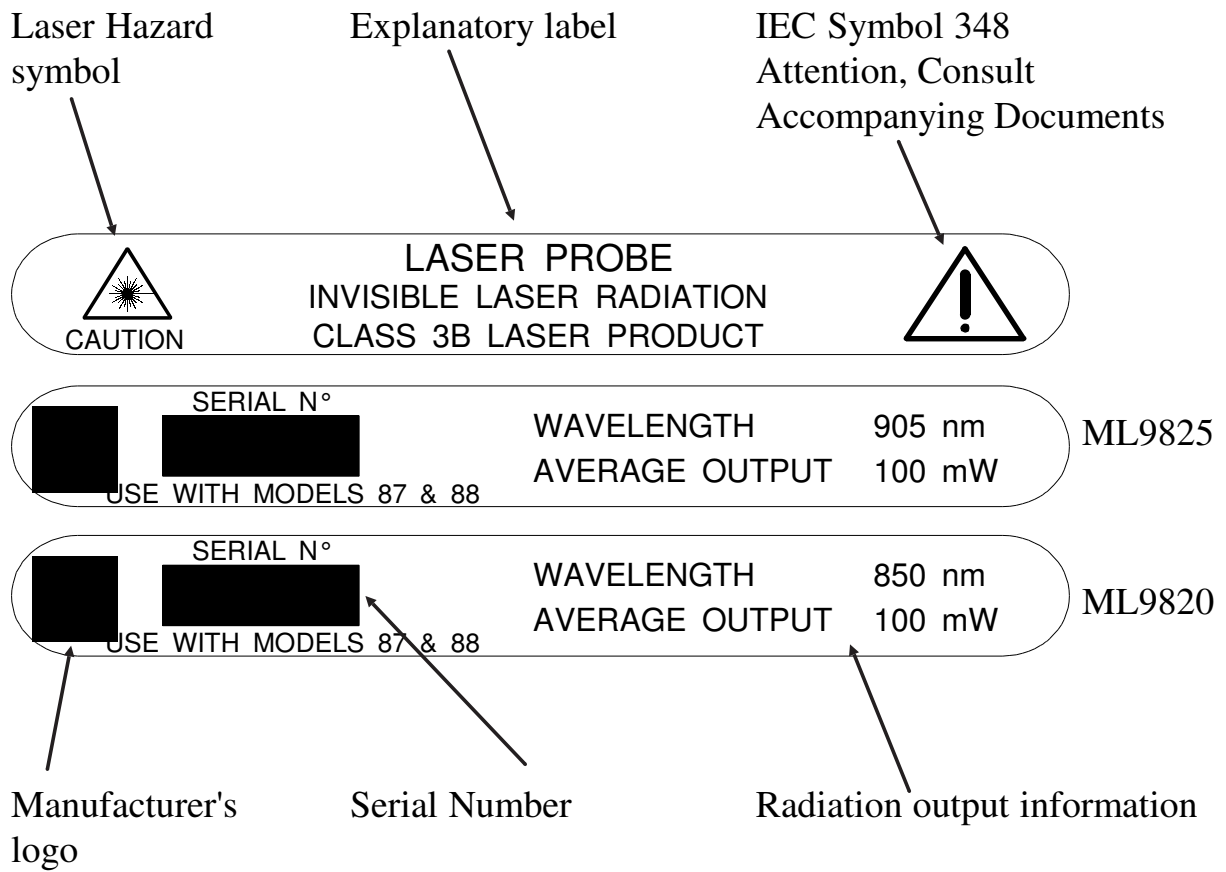


Figure 8 - 100 mW Laser Probe labelling

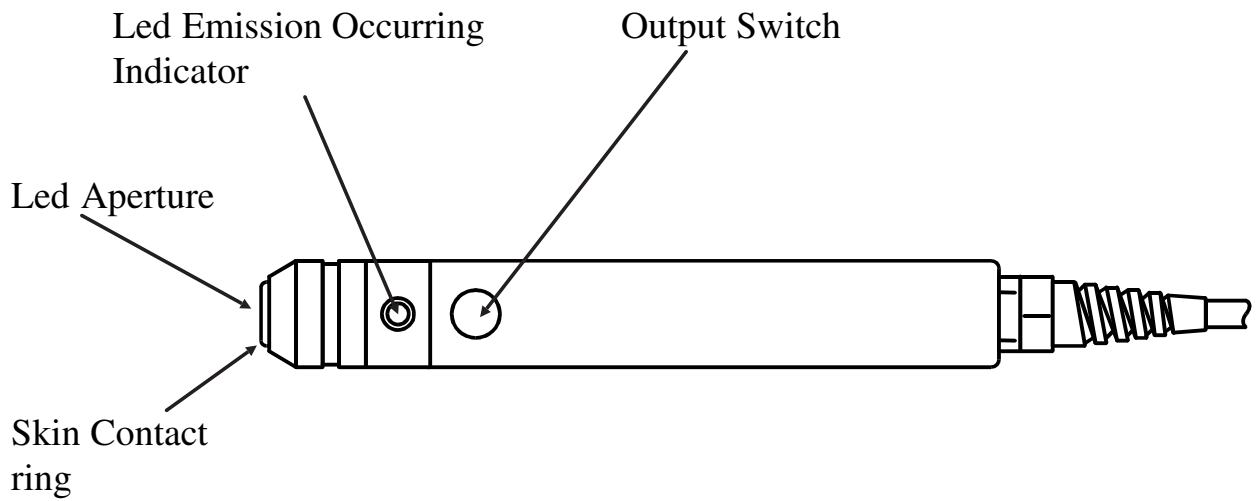


Figure 9 - 10 mW Visible Probe

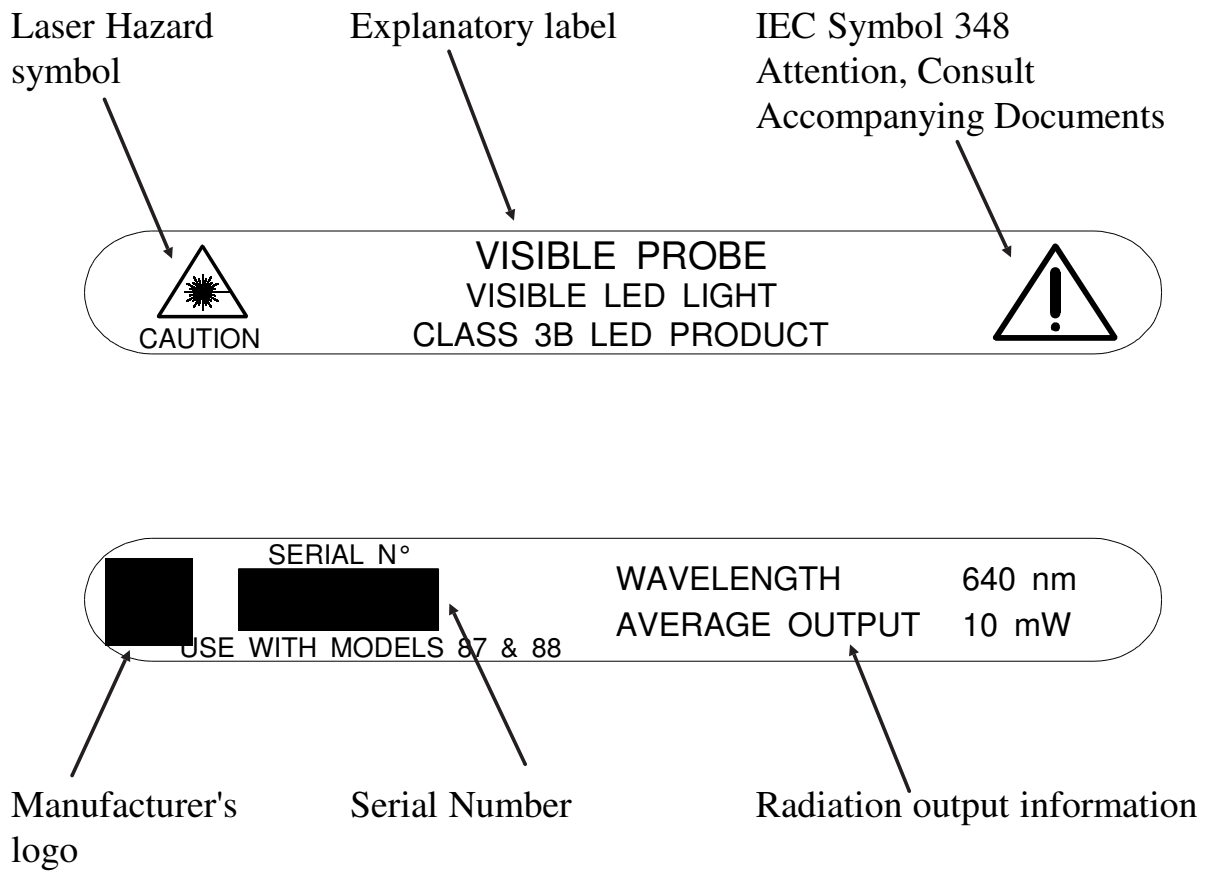


Figure 10 - 10 mW Visible Probe labelling

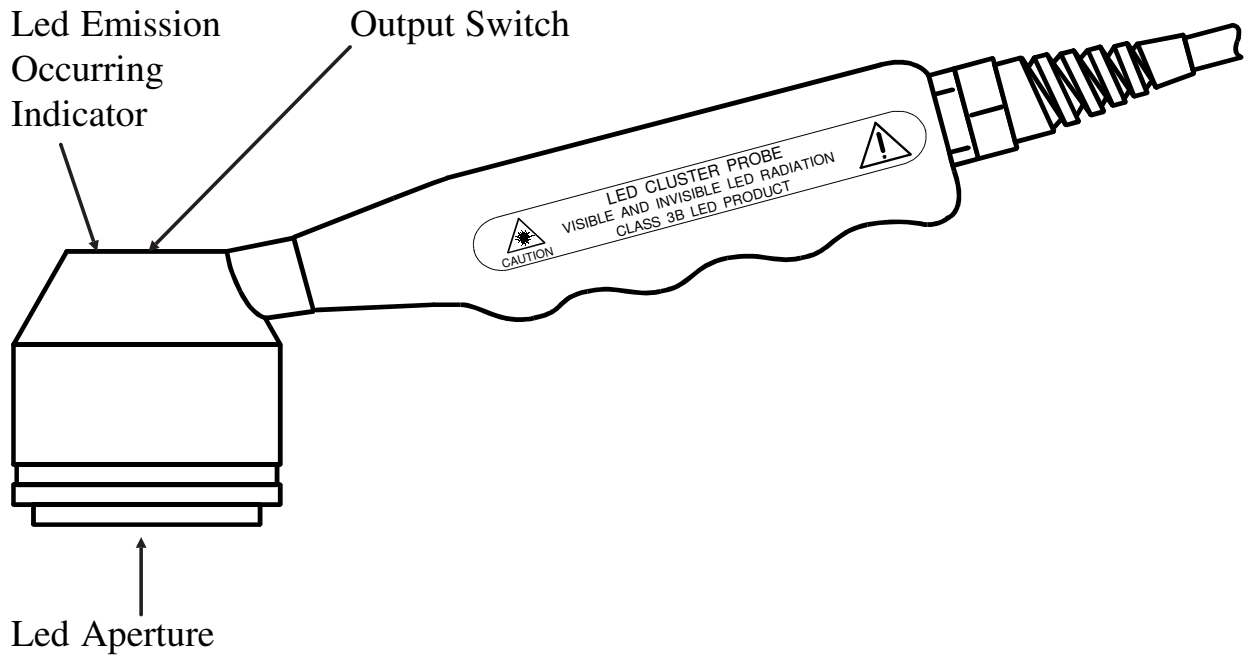


Figure 11 - 19 Diode Cluster Probe

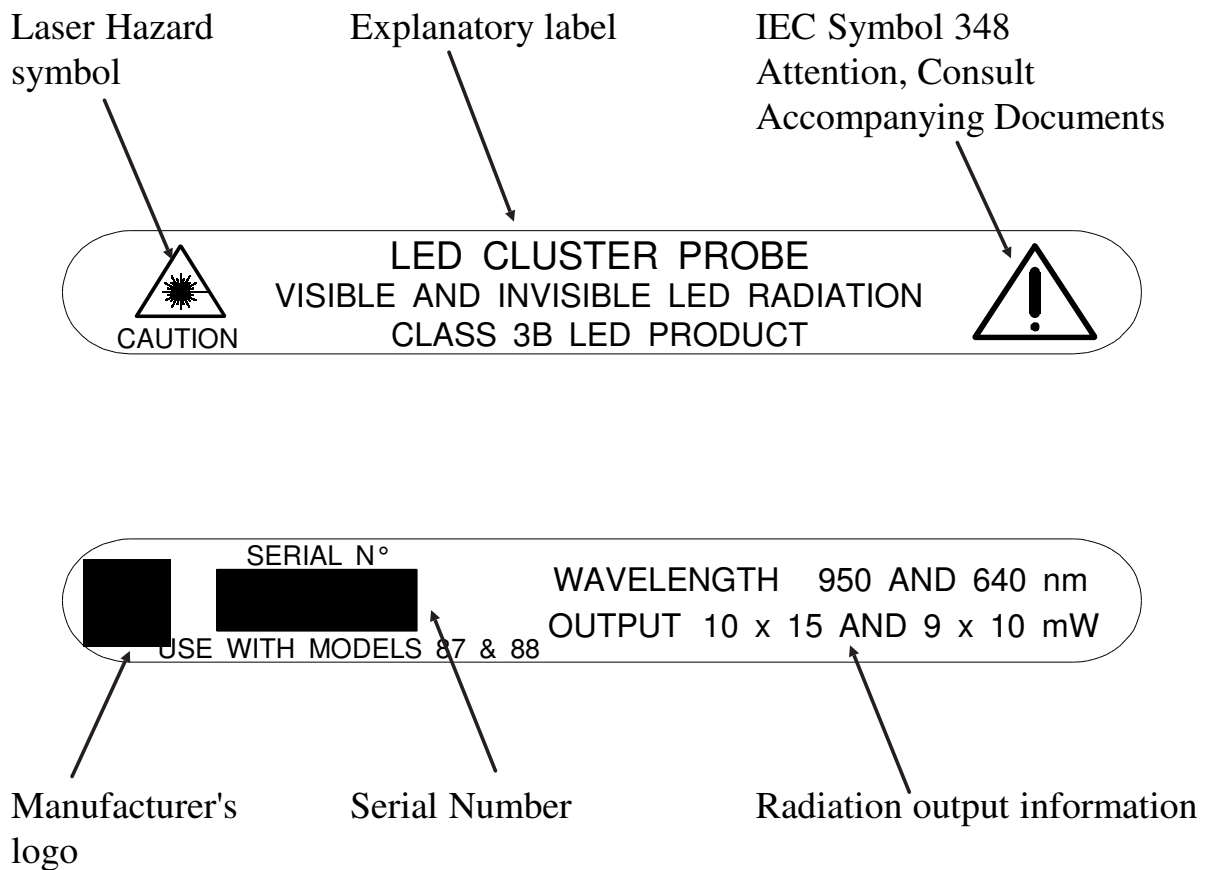


Figure 12 - 19 Diode Cluster Probe labelling

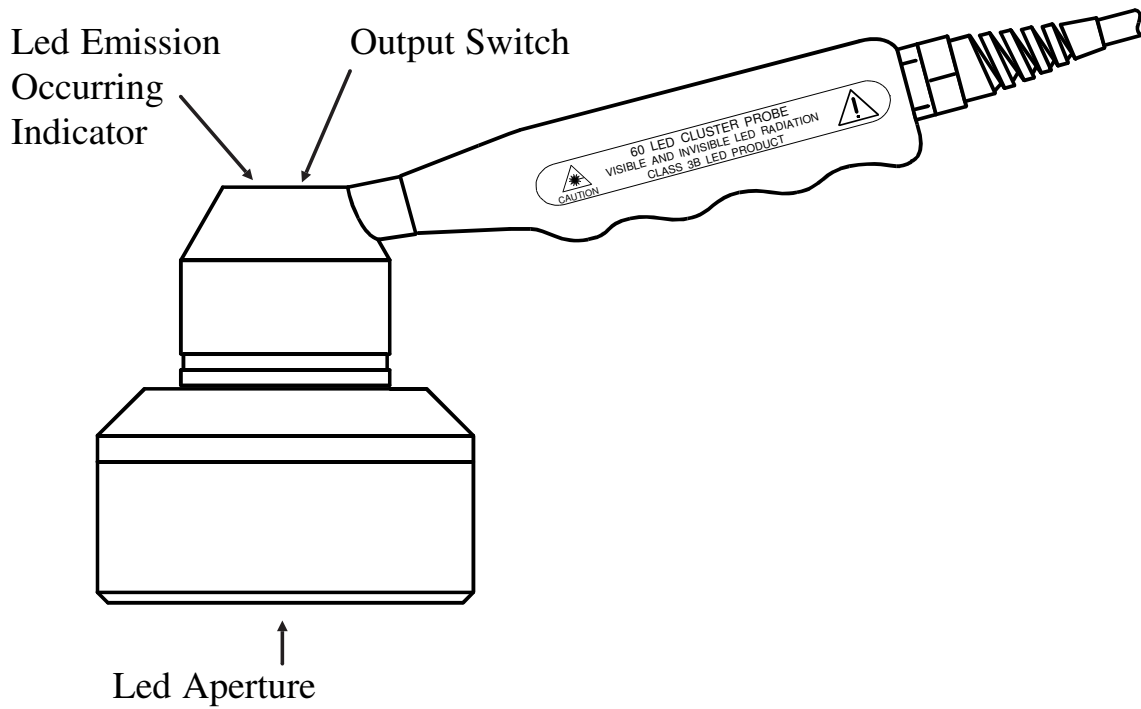


Figure 13 - 60 Diode Cluster Probe

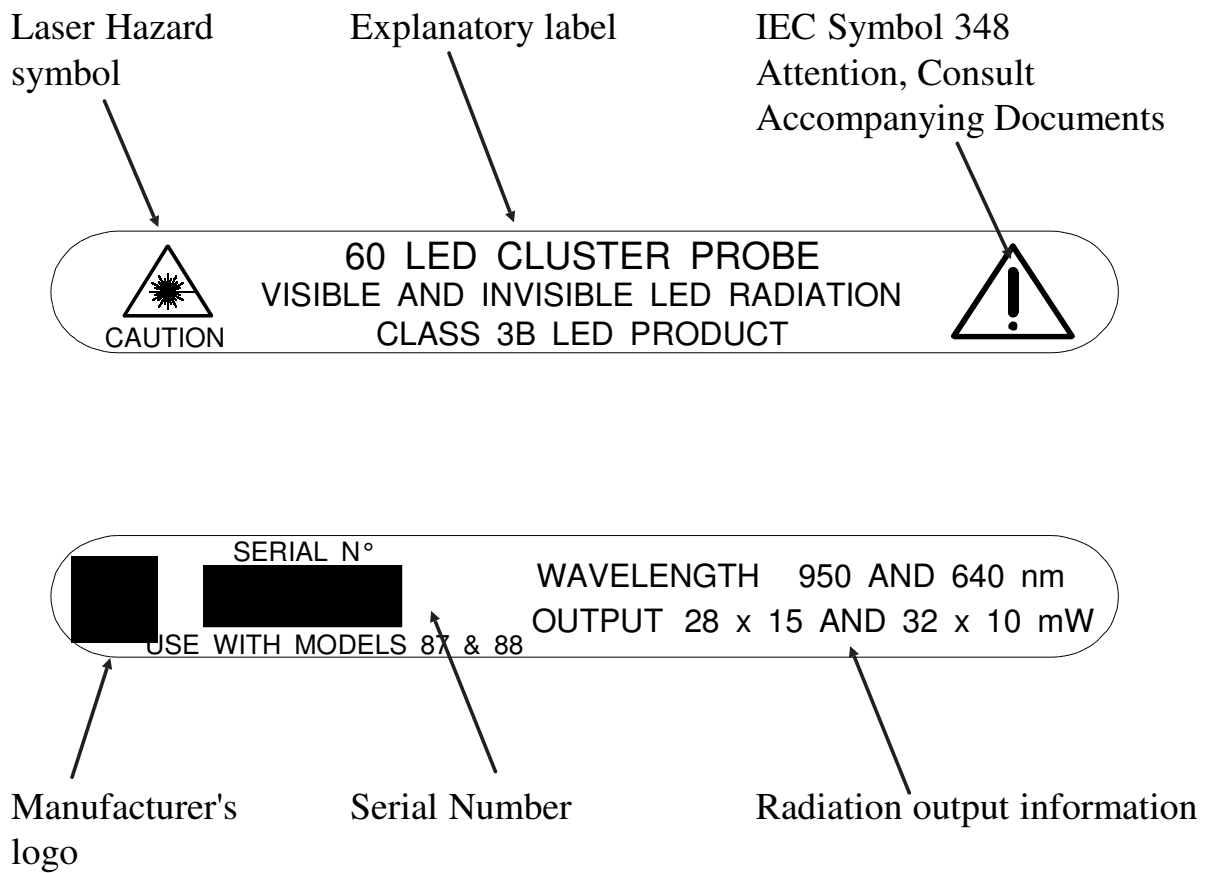


Figure 14 - 60 Diode Cluster Probe labelling

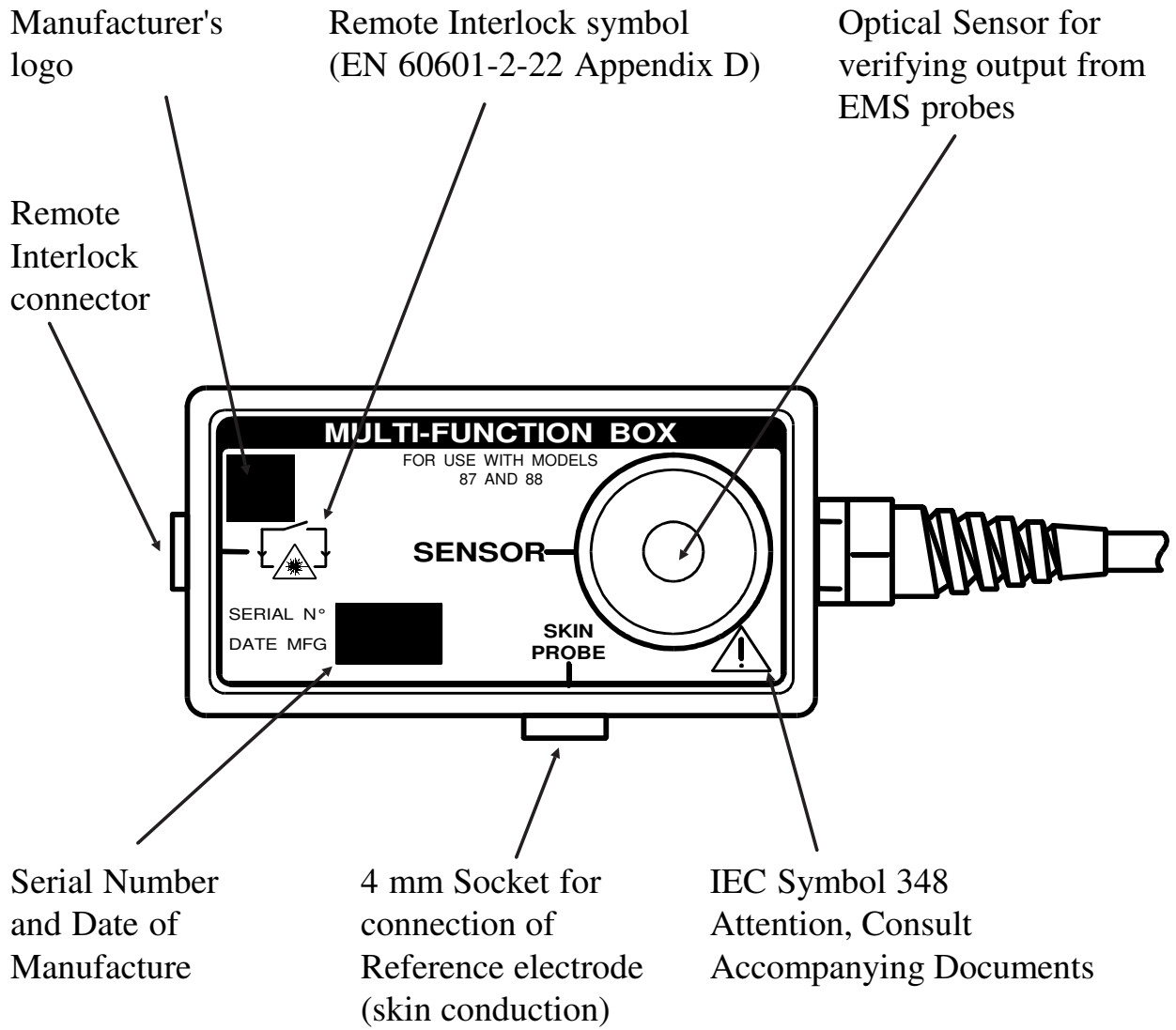


Figure 15 - Multi-Function Box

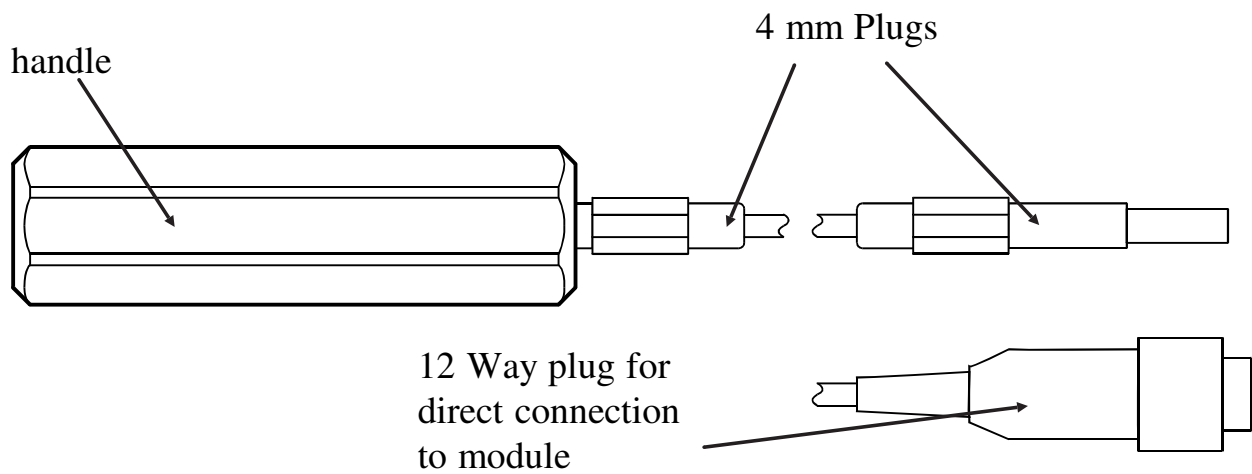


Figure 16 - Reference Electrode

# Operating Instructions

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1. Having connected the Medi-Link system to a suitable mains supply and positioned the display at a suitable angle, switch on using the power switch on the Control Module. The mains indicator on the Control Module will light and the display will show the title screen (figure 1) and after approximately two seconds, the System Menu will appear (see figure 2).
2. Move the highlighted bar to Laser with the up and down arrow keys and then press ENTER.
3. The Medi-Link will run the Laser program and the display will change to show the Laser Security screen (figure 17).

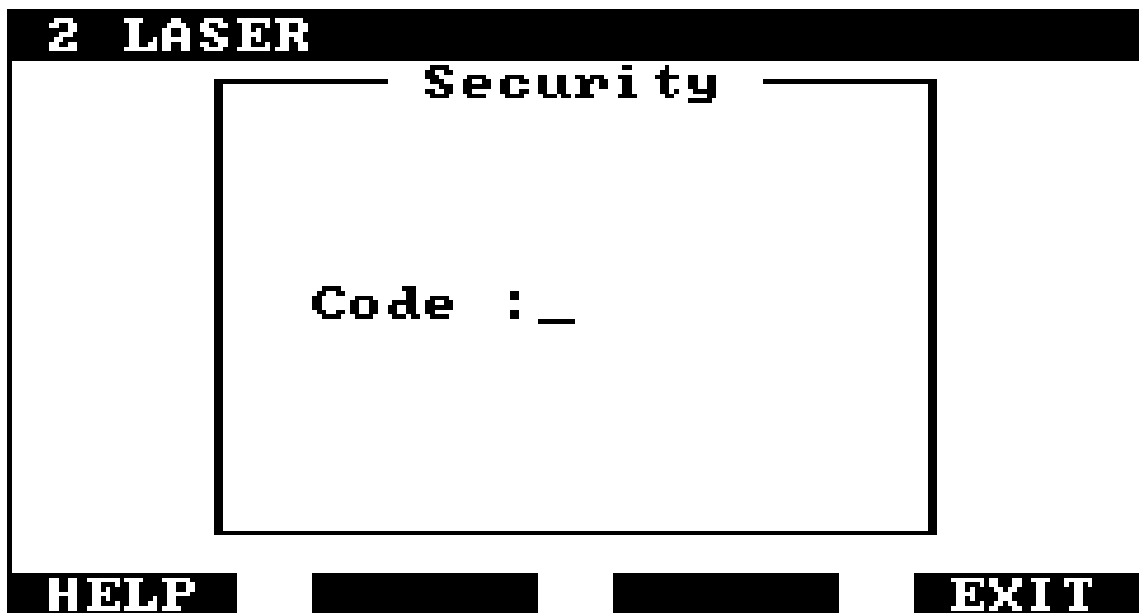


Figure 17 - Laser Security Screen

4. Enter your user access code from the numeric keypad on the Medi-Link Control Module, confirming the entry with the ENTER key. The access code may be up to 6 digits. The left arrow key acts as a backspace in case the wrong numeric key is pressed.

Press F4 - EXIT to return to the System Menu without using the Medi-Link Laser.

If you do not have an access code consult your Laser Protection Adviser or Laser Safety Officer.

When a valid user access code is entered the system will allow entry to the Laser program and the main Laser Set-Up screen will be displayed (figure 18).

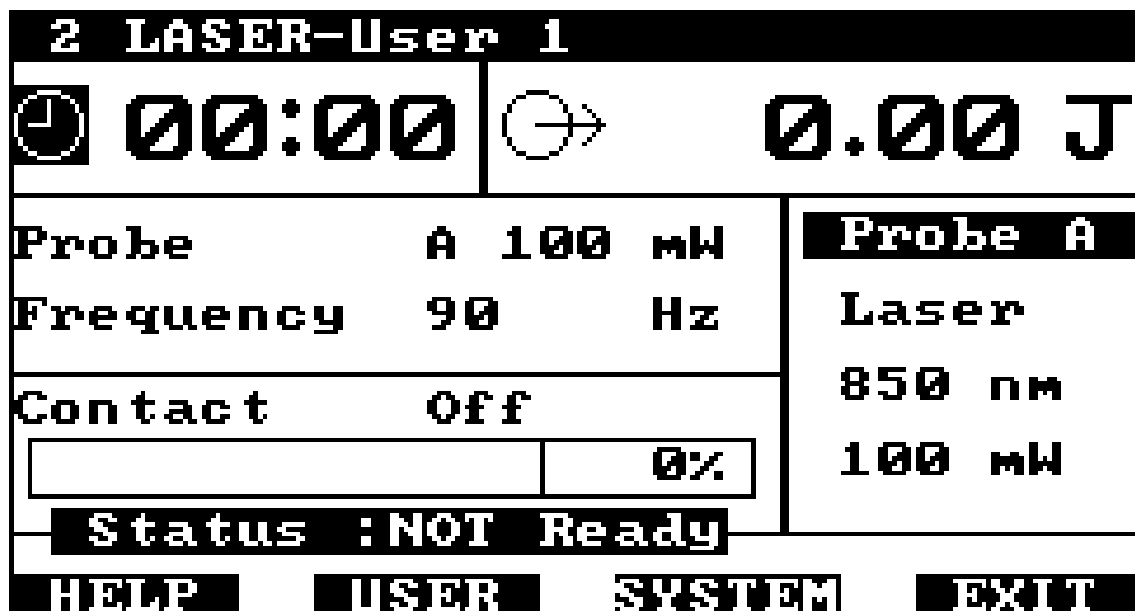


Figure 18 - Set-Up Screen

5. The current user number is displayed next to the the module title at the top of the screen.

Just below the title bar, are the treatment time and output energy displays. The output energy is the total optical energy in joules to be delivered with the currently selected probe in the treatment time set. The figure is automatically updated whenever the treatment time or probe type is changed.

Near the bottom of the screen is the status bar. The system will not allow the output to be energised until the status bar shows 'Ready'. The status will change to ready approximately 2 seconds after the system detects that a valid set-up has been entered.

6. To change the module settings, use the up and down arrow keys to highlight the parameter to be changed.

7. **Treatment Time:** The maximum Treatment Time is 10 minutes. The Treatment Time can be set in two ways.

When the clock symbol is highlighted, the Treatment Time may be incremented by 10 seconds at a time by pressing the right arrow key, or decremented by pressing the left arrow key.

Alternatively, if the ENTER key is pressed when the clock symbol is highlighted, a sub-window will appear ( figure 19). The Treatment Time may now be entered in minutes and seconds from the numeric keypad, confirming each entry with the ENTER key. The left arrow key acts as a backspace in case the wrong numeric key is pressed.

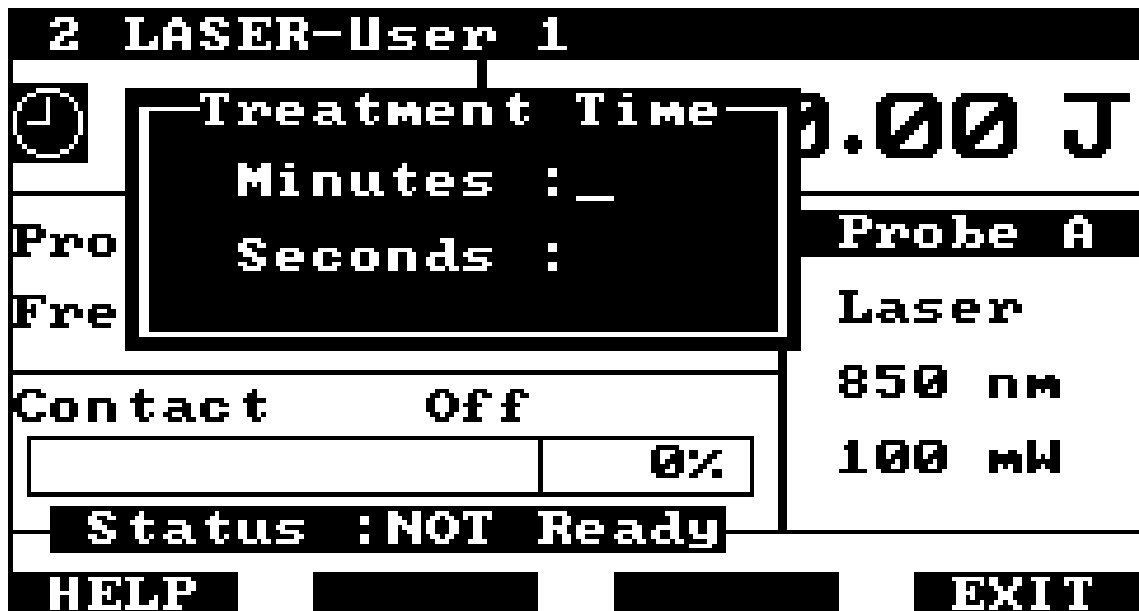


Figure 19 - Setting the Treatment Time

If F4 is pressed while the Treatment Time sub-window is displayed, the system will return to the Set-Up display without updating the time. If an invalid Treatment Time is entered (greater than 10 minutes or greater than 59 seconds) the system will give a short beep, clear the entry and wait for the user to enter another value. Pressing ENTER without entering a numeric value, will set the Treatment Time to zero.

Note that when the treatment time is changed, the output energy display is automatically updated.

**8. Probe:** A number of different probes are available for use with the Medi-Link Laser module. If not already connected to the Laser module, plug the required probe into one of the modules output sockets. The probe may be selected by pressing the left or right arrow key when the Probe label is highlighted.

Alternatively if the ENTER key is pressed when the Probe label is highlighted, a sub-window will appear (figure 20). The available probes will be displayed in the sub-window with the current selection highlighted. Use the up and down arrow keys to highlight the required probe and then press ENTER.

If F4 is pressed while the Probe sub-window is displayed, the system will return to the Set-Up display without updating the probe type.

Whenever a probe is plugged in or out of one of the output sockets on the Laser module the system will update the probe list.

Note that when the probe type is changed, the output energy display is automatically updated.

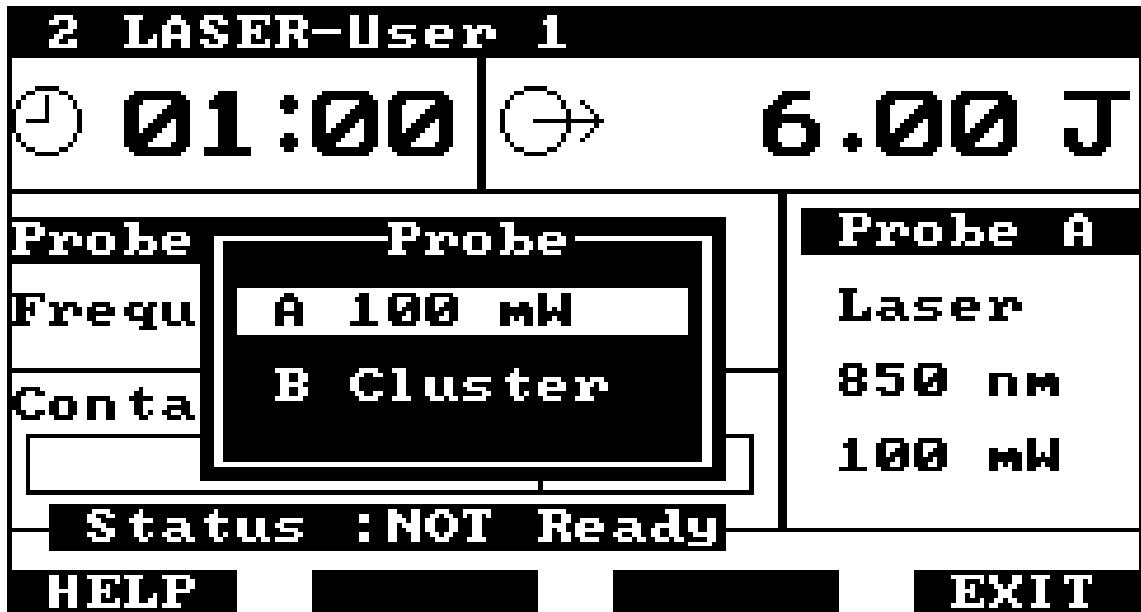


Figure 20 - Selecting a Probe

9. **Frequency:** The Medi-Link Laser module provides 8 standard frequencies and a user defined option which allows the frequency to be set in 1 Hz increments to any value between 2 Hz and 25 kHz. A standard frequency may be selected in two ways.

When the Frequency label is highlighted on the Set-Up screen, pressing the left or right arrow key will change the frequency to the previous or next standard value respectively.

Alternatively if the ENTER key is pressed when the Frequency label is highlighted, a sub-window will appear (figure 21).

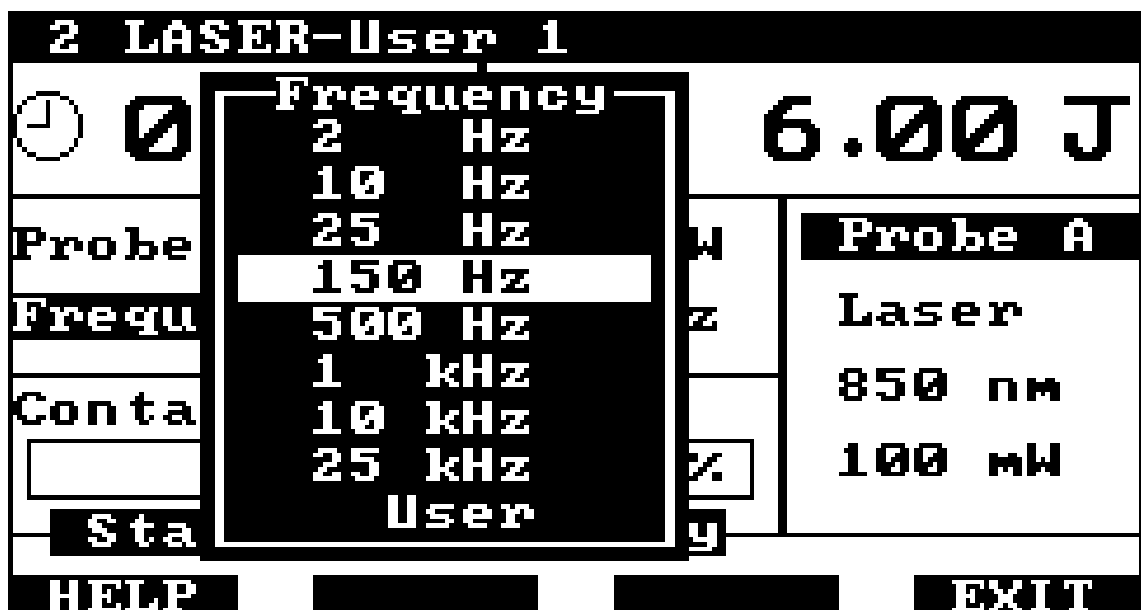


Figure 21 - Setting the Frequency

The available frequency options will be displayed in the sub-window with the current selection highlighted. Use the up and down arrow keys to highlight the required setting and then press ENTER. If a frequency other than User has been selected, the system will return to the Set-Up display and update the frequency.

If F4 is pressed while the Frequency sub-window is displayed, the system will return to the Set-Up display without updating the frequency.

If User is selected a second sub-window is displayed requesting entry of the required frequency in hertz (figure 22).

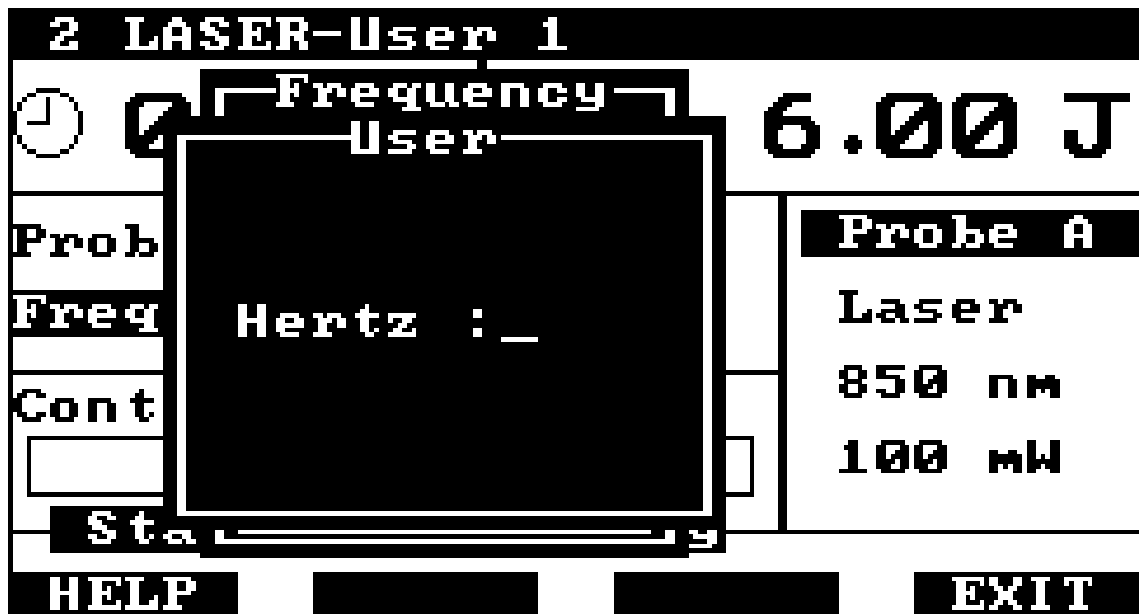


Figure 22 - Setting a User-Defined Frequency

The screen cursor is positioned by the Hertz label. Enter the desired Frequency using the numeric keypad, confirming the entry with the ENTER key. The left arrow key acts as a backspace in case the wrong numeric key is pressed. If a value less than 2 or greater than 25000 is entered, the system will give a short beep, clear the entry and wait for the user to enter another value.

If F4 is pressed while the User sub-window is displayed, the system will return to the Frequency sub-window to allow a standard frequency to be selected.

The pulse frequency may also be changed using the rotary control on the Laser module. Rotating the control clockwise will increase the frequency and rotating the control anticlockwise will decrease the frequency.

The frequency may be changed using the rotary control even when the optical output is enabled during treatment.

10. **Contact:** When using single point probes, the skin conduction option may be used to either ensure that laser or led radiation is only emitted from the probe when the probe is in contact with the patient's skin or for trigger point location.

The contact option is used to set the conduction threshold at which the probe will be energised. When the contact option is set to 'Off' the conductance measurement system is disabled. The contact threshold may be set in 10% increments.

When the Contact label is highlighted, pressing the left or right arrow key selects the previous or next setting respectively.

Alternatively if the ENTER key is pressed when the Contact label is highlighted, a sub-window will appear (figure 23).

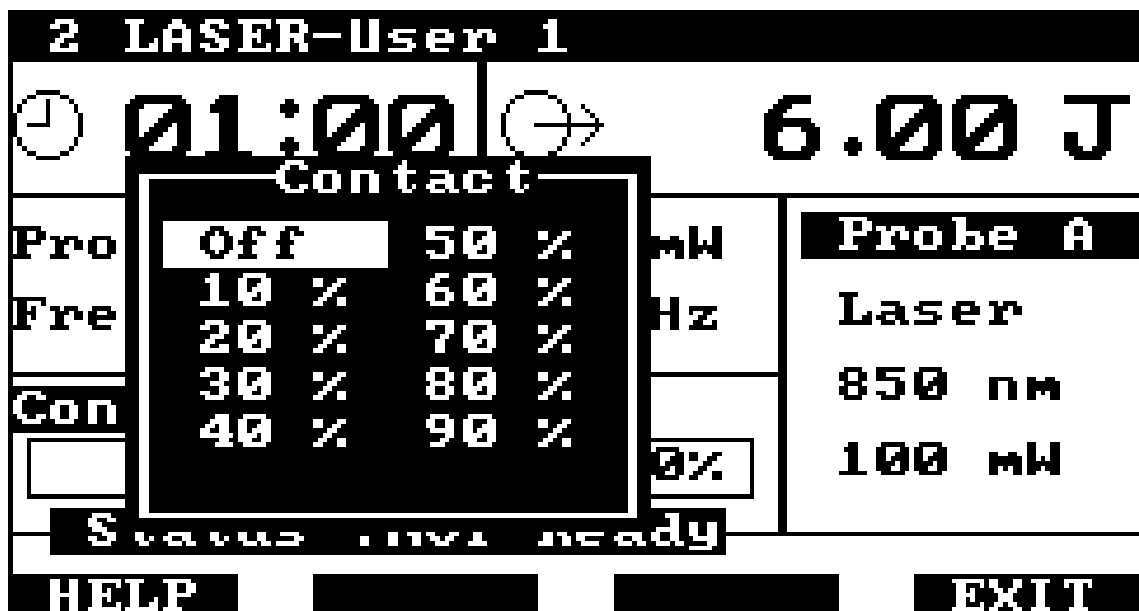


Figure 23 - Setting the Contact Threshold

The available threshold settings will be displayed in the sub-window with the current selection highlighted. Use the up and down arrow keys to highlight the required setting and then press ENTER.

If F4 is pressed while the Contact sub-window is displayed, the system will return to the Set-Up display without updating the setting.

For further information on the Skin Conductance facility see page 30.

11. **Output Energy:** The output energy is the total optical energy in joules to be delivered with the currently selected probe in the treatment time set. The figure is automatically updated whenever the treatment time or probe type is changed.

It is also possible with the Medi-Link Laser module to enter a value for the energy to be delivered during treatment and the program will then calculate and set the treatment time required to deliver that energy with the currently selected probe. To enter an output energy value, highlight the output symbol using the up and down arrow keys, and then press ENTER. A sub-window is displayed requesting entry of the required energy in joules (figure 24).

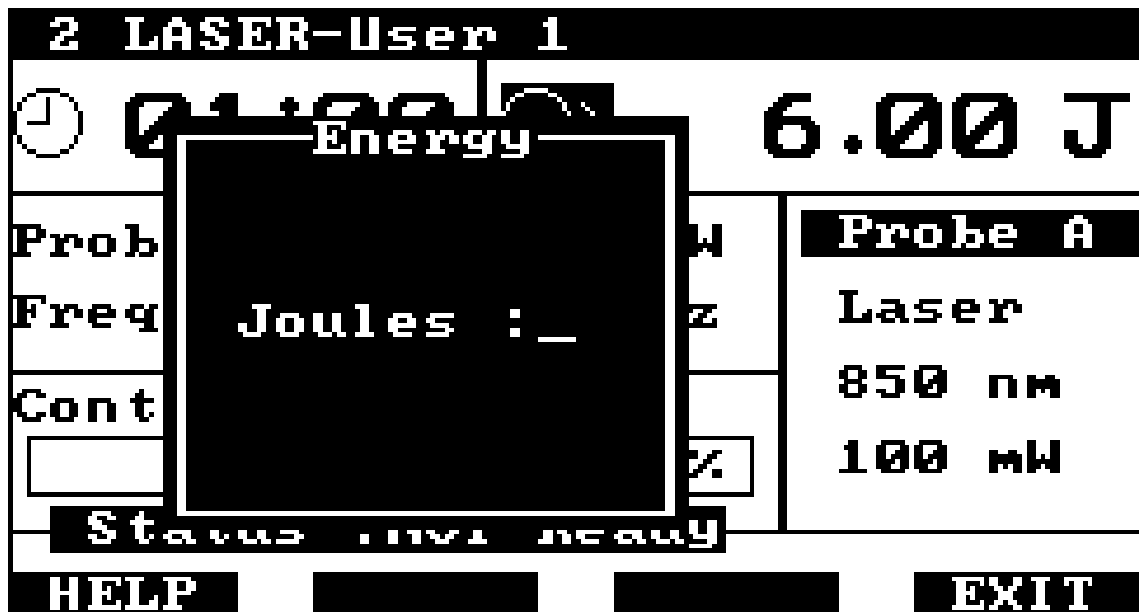


Figure 24 - Setting the Output Energy

The screen cursor is positioned by the Joules label. Enter the desired Energy using the numeric keypad, confirming the entry with the ENTER key. The left arrow key acts as a backspace in case the wrong numeric key is pressed. If a value greater than 120 is entered, the system will give a short beep, clear the entry and wait for the user to enter another value. When ENTER is pressed the system returns to the main Set-Up screen and updates the Output Energy and Treatment Time.

If F4 is pressed while the Energy sub-window is displayed, the system will return to the main Set-Up screen without updating any of the settings.

Warning messages are given for treatment times in excess of 10 minutes, and attempting to set an output energy without a probe first being selected.

12. Approximately 2 seconds after a valid set-up has been entered, the system status will change to ready

**Status : Ready**

Before energising the output, ensure that both the patient and the therapist are fitted with protective eyewear.

The output switch on each probe may act as a momentary switch or a toggle switch dependent upon the settings for the current user code (See security features). If set to momentary, then the switch must be held depressed during treatment. Releasing the switch will immediately terminate the output from the probe. If set to toggle, then pressing the switch once and releasing it will enable the probe output. Pressing the switch a second time will terminate the probe output.

The module may also be set to emit an audible warning during treatment. If the sound option is set to 'On' (see security features) then a short tone (laser emission occurring warning) is emitted every two seconds during treatment.

### 13. Non-contact treatment

Make sure that the contact setting is 'Off'. Position the selected probe over the treatment site. Turn the output on using the output switch on the probe.

If the status of the module was 'NOT Ready' then a message will be displayed at the bottom of the screen to turn the output switch off again.

If the status of unit is 'Ready' then the word 'Treatment' will flash at the bottom of the display, the laser (or led) emission occurring indicator on the probe and light below the output socket on the module will light, and the treatment time and energy display will start count down (figure 25).

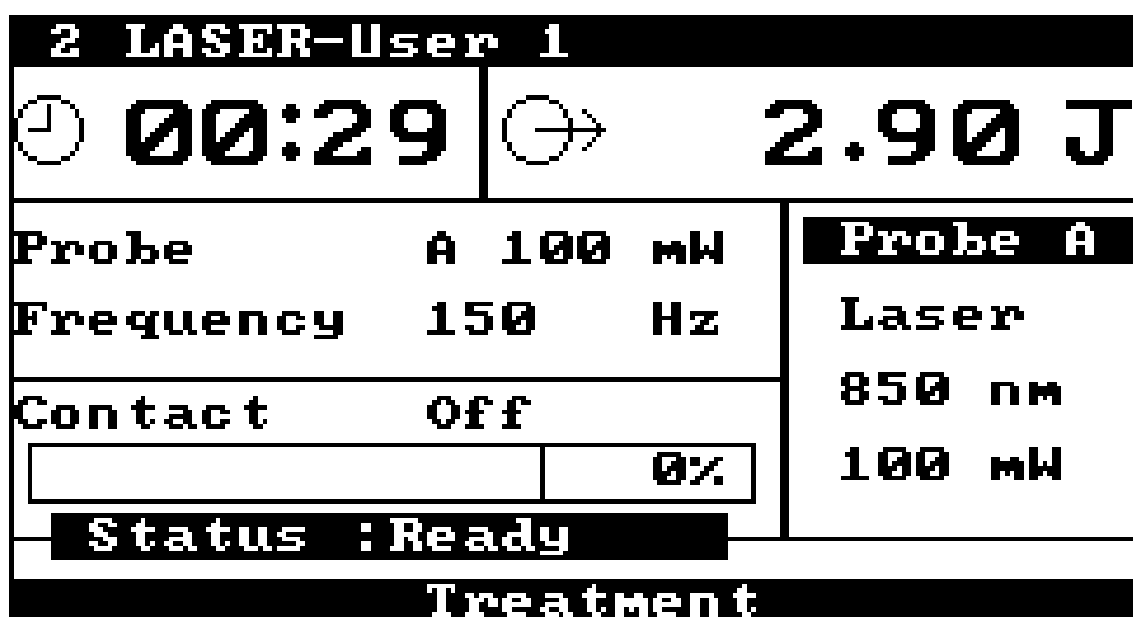


Figure 25 - Display during treatment

If the output switch on the probe is used to terminate the output before the treatment time has elapsed, the display will show the remaining treatment time and energy. When the switch is activated again the treatment will continue from where it was interrupted.

When the treatment time reaches 00:00, the optical output from the probe will be terminated, the laser (or led) emission occurring indicator on the probe and the light below the output socket will turn off, the display will show zero energy, at the bottom of the screen an instruction to turn off the appropriate probe will flash and an intermittent alarm will sound (figure 26). Operate the switch on the probe and the alarm will cease and the treatment time and energy will be reset ready for the next treatment.

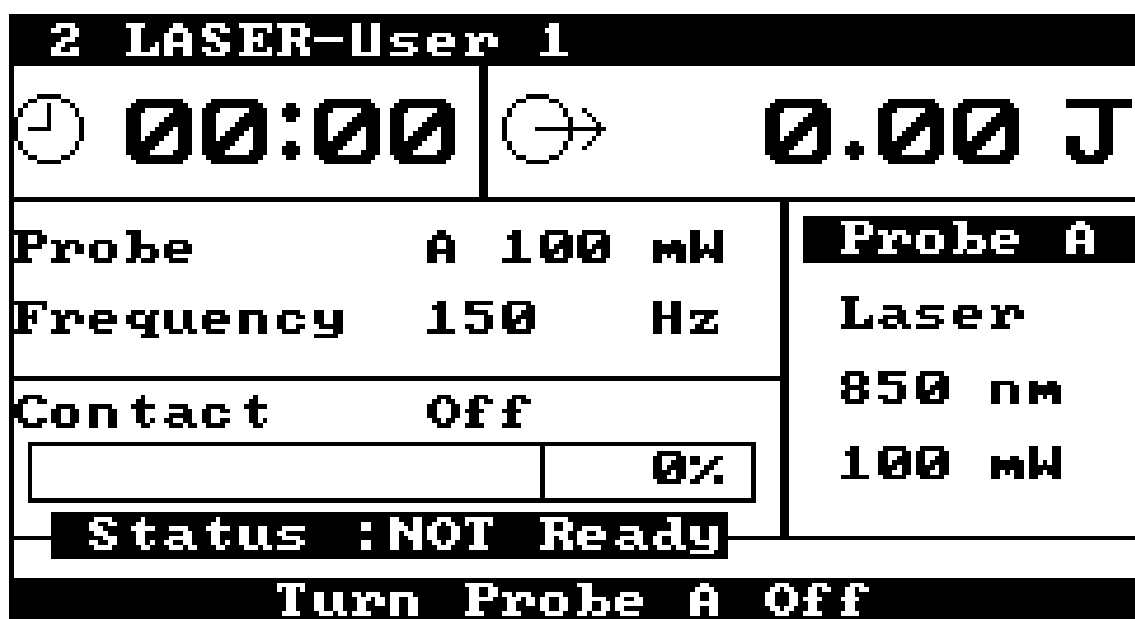


Figure 26 - Display at end of treatment

#### 14. Contact Treatment

The contact option may be used with either of the single point probes to ensure that the optical output is only enabled when the probe is in skin contact, or to locate trigger points. Turn the contact option on, as described in section 10 above.

To use the contact option, either connect the multi-function box (figure 15) to the unused front panel socket and connect the reference electrode (figure 16) to the socket labelled 'Skin Probe' with the lead with 4 mm plugs at each end, or connect the reference electrode directly to the unused front panel socket using the lead with the 12 way connector at one end. Give the reference electrode to the patient to hold. Place the end of the probe on the patients skin at the treatment site.

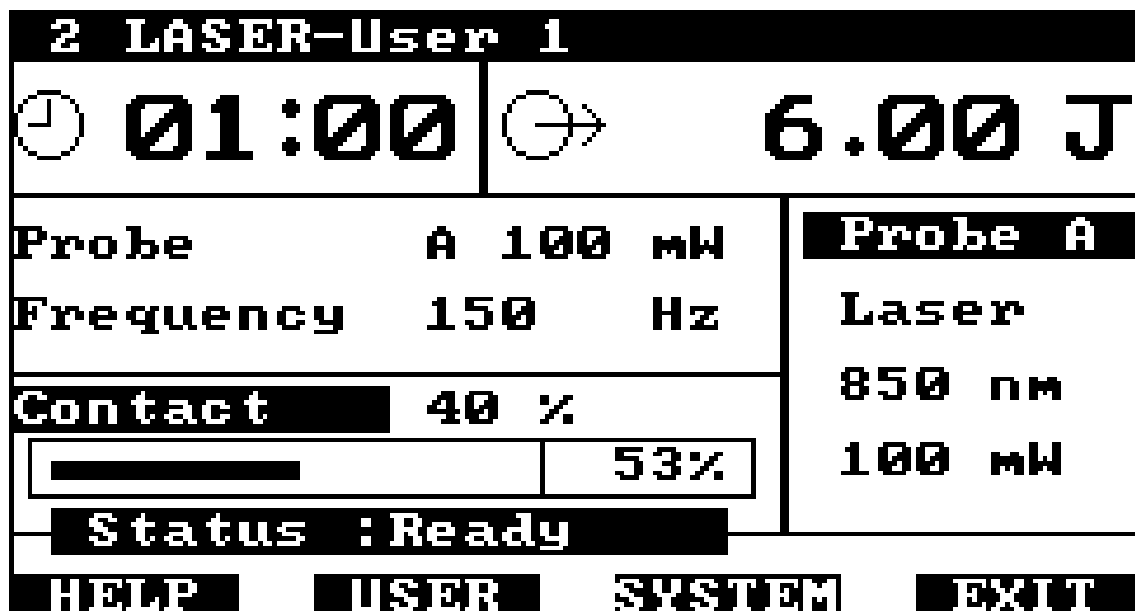


Figure 27 - Contact Reading

The bar graph and adjacent numeric display will give a conductivity in arbitrary units (figure 27) - 0% is open circuit, 100% is short circuit. As the probe is moved over the patient's skin the reading will change. The highest readings will be obtained at 'trigger points' - these are the desired points to treat for pain relief. Adjust the contact for a setting below the maximum reading obtained. When the system status has changed to 'Ready' energise the output using the output switch on the probe. Treatment will proceed as for non-contact treatment above.

If the probe is removed from the skin then the laser (or led) emission occurring light on the probe will go out, the treatment time will cease to count down, the display will flash the message "Contact" at the bottom of the screen (figure 28).

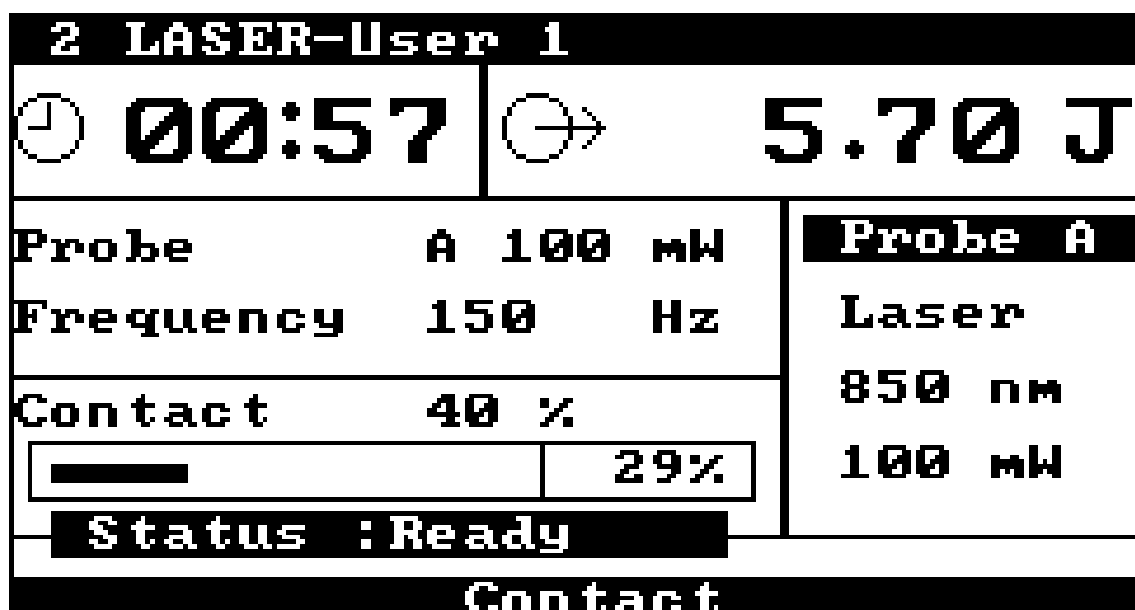


Figure 28 - Contact below threshold

When good contact is restored then the word "Treatment" will return to the bottom of the screen, the treatment time will continue to count down and the laser emission occurring indicator on the probe will light.

When the treatment time reaches 00:00, the optical output from the probe will be terminated, the laser (or led) emission occurring indicator on the probe and the light below the output socket will turn off, the display will show zero energy, at the bottom of the screen an instruction to turn off the appropriate probe will flash and an intermittent alarm will sound (figure 26). Operate the switch on the probe and the alarm will cease and the treatment time and energy will be reset ready for the next treatment.

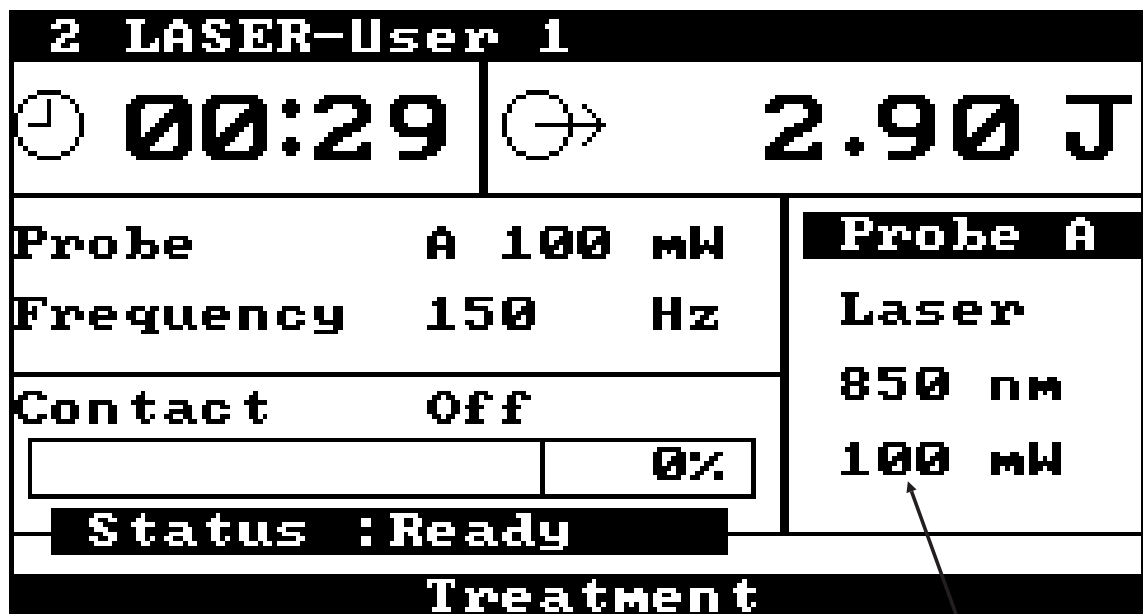
Note that the contact option is not for use with the cluster probe.

### 15. Optical Output Checks

The multi-function box also provides a means of checking the probe output. If a single point probe is placed in the sensor receptacle of the multi-function box and the probe output is enabled, the power display at the bottom right of the screen will give an estimate of the probe's output power. The accuracy of the measurement is  $\pm 20\%$ . When the output is turned off or the probe is removed from the receptacle, this display shows the probe's nominal output power.

This facility is not to be used for probe output power calibration.

The sensor is only suitable for verifying the output of probes connected to the other output socket of the laser module.



Output Power Display

Figure 29 - Optical output power check

16. **F1 - HELP:** When the label for function key F1 is HELP, pressing F1 will suspend the current activity and the display will show help text relevant to the current display or activity (figure 30). If the help text is more than can be displayed at one time, it may be scrolled up or down, one line at a time using the up and down arrow keys, or one screen full at a time by pressing F2 - PgUp or F3 - PgDn. To exit from HELP, press F4.

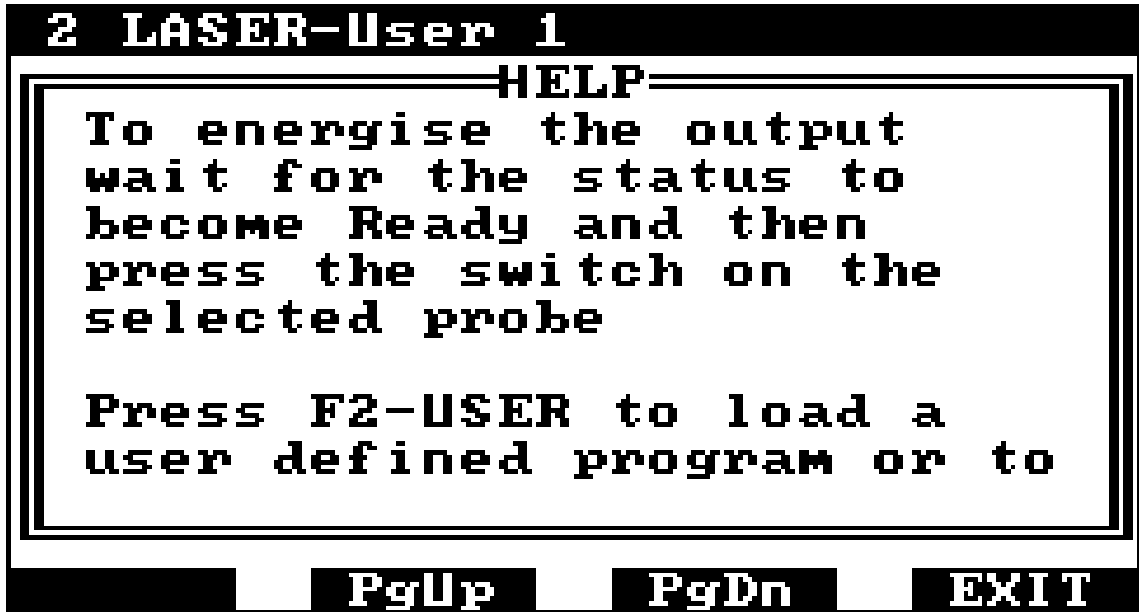


Figure 30 - Help Text Display

17. **F2 - USER:** In order to save time setting up the Laser Module up to 16 individual set-ups can be saved as "User Defined Programs". To save the current set-up as a user defined program, press F2-USER from the main Set-Up display. The system will recall previously saved programs and display them as in figure 31.

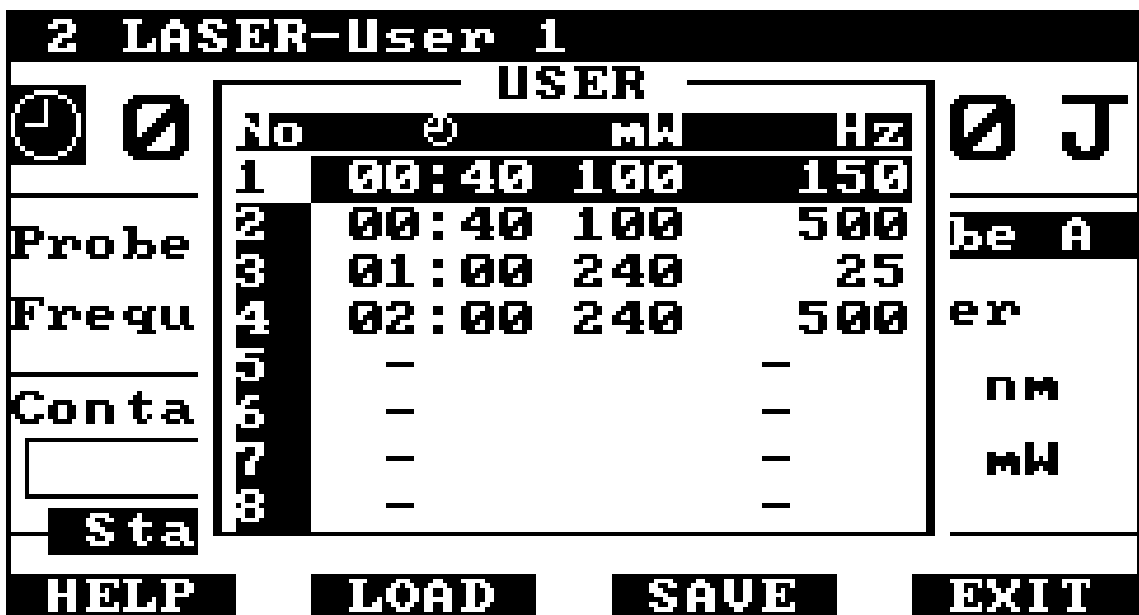


Figure 31 - User Program Display

Programs shown as dashes, for example, programs 5 to 8 in figure 30, have not been used and are blank.

Use the up and down arrow keys to highlight the program to which the current set-up is to be saved.

To save the current set-up, press F3 - SAVE. The system will save the set-up and return to the main Set-Up display.

To recall a previously saved program, again press F2 - USER to display the user defined programs. Use the up and down arrow keys to highlight the program to be recalled.

To recall the program press F2 - LOAD. The system will return to the Set-Up display and update the settings to those of the recalled program. If an undefined program is selected the system will give a short beep and wait for the user to make another selection.

To exit from the user sub-window without loading or saving a user defined program, press F4 - EXIT.

18. **F3 - SYSTEM:** Pressing F3 - SYSTEM returns the user back to the System Menu, but without stopping the Laser program running. This enables the user to run another application, for example, Ultrasound or Interferential therapy. When F3 - SYSTEM is selected the Laser set-up is shown as an inset screen to the right of the display (figure 32).

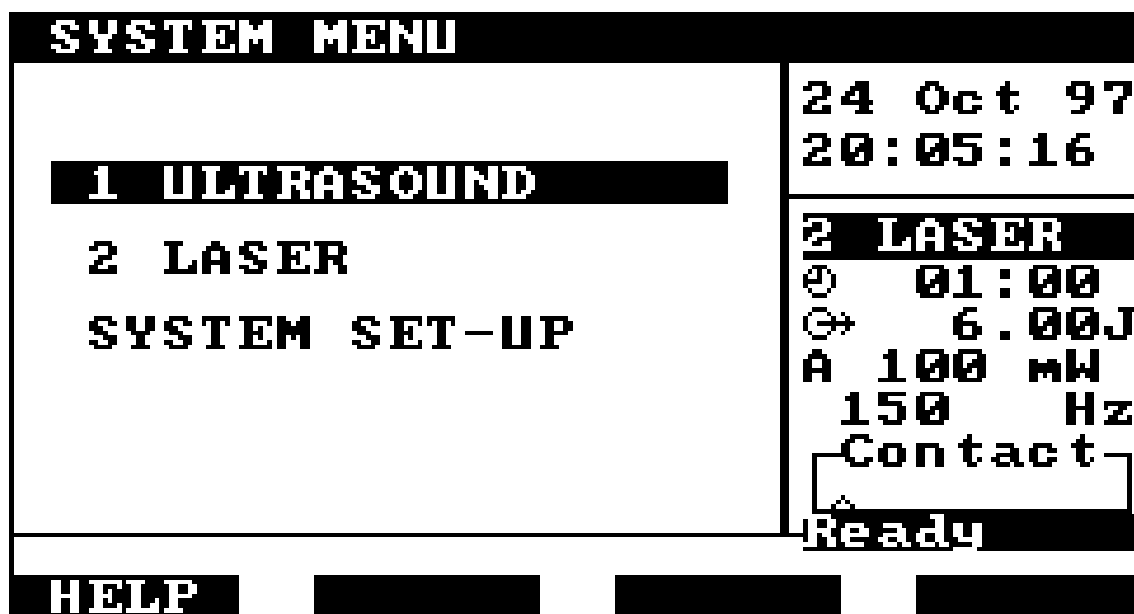


Figure 32 - Laser as inset screen

When running as an inset screen, the output may be turned on in exactly the same way as when the full screen display is available, and all alarms and ends of treatment are still reported as before. The only restriction is that the keys on the Control Module are now assigned to another program. All set-up must be done in full screen mode. Then select the SYSTEM option before turning the output on. Another module may then be selected and set-up for treatment.

19. **F4 - EXIT:** Pressing F4 - EXIT at the Laser module Set-Up display will terminate the Laser program and return to the System Menu. When the Laser program is re-run from the System Menu a user access code must again be entered. Upon entering the Laser Set-Up screen, the settings will be as they were when F4 - EXIT was pressed unless the system has been switched off.

## Security Features

In order to control access to the Laser module, the Medi-Link Laser system has up to five user access codes available. A valid user access code must be entered before the Laser module can be used. User access codes may be set up by the Laser Safety Adviser by entering a master code at the Laser Security screen (figure 17). When the laser master code is entered, the Laser System Maintenance screen is displayed (figure 33).

	Access Code	Prb Sw.	Sound
0	000	***	***
1	001	Tog	On
2	002	Tog	Off
3	003	Mom	On
4	004	Mom	Off
5	005	Mom	Off

HELP UNDO SAVE EXIT

Figure 33 - Laser System Maintenance

The master code (Code 0) and the 5 user codes (Codes 1 to 5) are listed on the display. Associated with each user code are two options.

The switch on each laser or led probe may act as a momentary switch (mom) or a toggle switch (tog). If momentary action is selected, then the probe will only emit laser or led radiation while the switch is pressed. Immediately upon release of the switch, the output is terminated. If toggle is selected, then pressing and releasing the switch will enable the output from the probe. The output will remain on until the switch is pressed again or the treatment time has elapsed.

The sound option sets a laser emission occurring warning sound on or off. If set to on, the system will give a short beep every two seconds whenever the probe is emitting laser or led radiation.

To change the master code or a user code, first highlight the code using the up and down arrow keys, and then press ENTER.

The code will be erased and a cursor will appear at the first character position. Using the numeric keypad enter the new user code and confirm the entry with the ENTER key. A user code may be up to 6 digits long.

To change the probe switch action or the sound option, first highlight the setting using the up and down arrow keys. Pressing the left or right arrow key or ENTER will change the setting.

Pressing F2 will undo any changes made since the user codes and options were last saved.

Pressing F3 will save the currently displayed settings. Once saved the changes cannot be aborted using the F2 - UNDO option.

Press F4 to exit from the System Maintenance screen and return to the Security display. Any changes made are saved on exit.

# Maintenance

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The laser and led apertures and skin contact rings of the Laser and Led probes may be cleaned using alcohol wipes.

The Laser Module may be cleaned by wiping over with a clean damp cloth. The use of abrasive materials and cleaning solvents should be avoided.

Inspect the probes, cables and connectors periodically for signs of damage, especially cable insulation.

The optical output power from each probe should be checked at least annually. An optical power meter with an accuracy of at least  $\pm 5\%$  at the specified wavelength of the probe's radiation should be used. If the output power from the probe is not within  $\pm 15\%$  of the nominal output power it should be returned to the supplier for calibration.

**THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE UNIT AND THE TOP COVER MUST NOT BE REMOVED.**

Full servicing instructions are available on request.