

**SCHOTT North America, Inc.**

Part number: A20870

Serial number:

**DCR<sup>®</sup> III Plus**  
**Direct Current Regulated Light Source**  
**with Built-in RS232 Interface**

**User's Manual**  
**and**  
**Technical Reference**



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**SCHOTT**

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## 1.0. General Safety Notes

### 1.1. English

#### Warning

1. Never look directly at the lamp output, or at the Modulamp<sup>®</sup> light output port, or at the end of any attached fiber optic cable.
  2. Lamp and surrounding surfaces may be hot!
  3. Do not use this unit near any liquids or in an area with excessive moisture.
  4. Do not place flammable materials on or near the unit.
  5. Do not defeat the safety purpose of the 3-prong grounded plug. Use only an approved three-wire power cord. Route cord so that it will not be pinched, severed or walked upon.  
Within North America use only the approved power cord supplied with the unit.  
Outside North America use only grounded power supply cables with suitable connectors for the respective power outlet shapes.
  6. Do not defeat the purpose of the fuse. To reduce fire hazard, replace fuse only with the fuse type described in the manual and as marked on the unit.
  7. Unplug before servicing (servicing is for authorized personnel only). High voltage is present internally.
  8. Refer to the Technical References Section for safety instructions.
- 

### 1.2. French

#### Attention

1. Ne pas regarder directement la lampe quand elle fonctionne.
  2. La lampe et son logement peuvent être chaud.
  3. Ne pas utiliser cette source près de l'eau ou d'une zone particulièrement humide.
  4. Ne pas placer de matériau inflammable près de la source lumineuse.
  5. Ne détruisez pas la sécurité de la prise à 3 branche relié à la terre. A l'intérieur de L'Amérique du Nord, veuillez utiliser uniquement le cordon d'alimentation agréé fourni avec l'unité. Défaites le cordon pour qu'il ne soit pas pincé, coupé ou aplati. A l'extérieur de L'Amérique du Nord veuillez utiliser uniquement câbles d'alimentation reliés à la terre.
  6. Ne pas défaire la protection du fusible. Pour réduire le danger d'incendie, utilisez uniquement les fusibles décrits dans les conseils d'utilisation ou marqué sur l'unité.
  7. Débrancher avant entretien (Le service après-vente se fait uniquement par un personnel autorisé par le fabricant). Haute tension présente à l'intérieur.
  8. Se referer à la section Références Techniques, pour les instructions de sécurité.
- 

### 1.3. Italian

#### Precauzioni

1. Mai guardare direttamente la lampadina quando é accessa.
2. La lampadina e la superficie circostante possono essere surriscaldate.
3. Non utilizzare il generatore in presenza di acqua o in aree eccessivamente sporche.

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4. Non mettere materiali infiammabili vicino al generatore di luce.
  5. Non danneggiare l'isolamento della spina a tre pin.  
Within North America use only the approved power cord supplied with the unit.  
Route cord so that it will not be pinched, severed or walked upon.  
Outside North America use only grounded power supply cables with suitable connectors for the respective power outlet shapes.
  6. **To reduce fire hazard** Sostituire il fusibile solamente con un fusibile avente le caratteristiche descritte nel manuale e come indicato sul generatore.
  7. Disinscrivere la spina prima di effettuare riparazioni **-(servicing is for authorized personnel only)**: All'interno é presente alta tensione.
  8. Per istruzioni sulla sicurezza fare riferimento alla sezione delle informazioni tecniche.
- 

### 1.4. Spanish

#### **Attender**

1. Nunca mirar directamente la lámpara cuando iluminada.
2. La lámpara y las superficies cerca de la lámpara pueden estar muy calientes.
3. No use la unidad cerca del agua o en una zona muy húmeda.
4. No ponga material inflamable cerca de la unidad.
5. No arruine el propósito de seguridad del enchufe a tres puntas  
Within North America use only the approved power cord supplied with the unit.  
Route cord so that it will not be pinched, severed or walked upon.  
Outside North America use only grounded power supply cables with suitable connectors for the respective power outlet shapes.
6. No arruine el efecto del fusible. **To reduce fire hazard** Sustituya solamente con tipo de fusible descrito en el manual y como indicado sobre la unidad.
7. Desconecte antes de revisar **-(servicing is for authorized personnel only)**. Voltaje elevado está presente al interno.
8. Refiérase a la sección referencias técnicas para las instrucciones de seguridad

## 2.0. Quick Start Operation

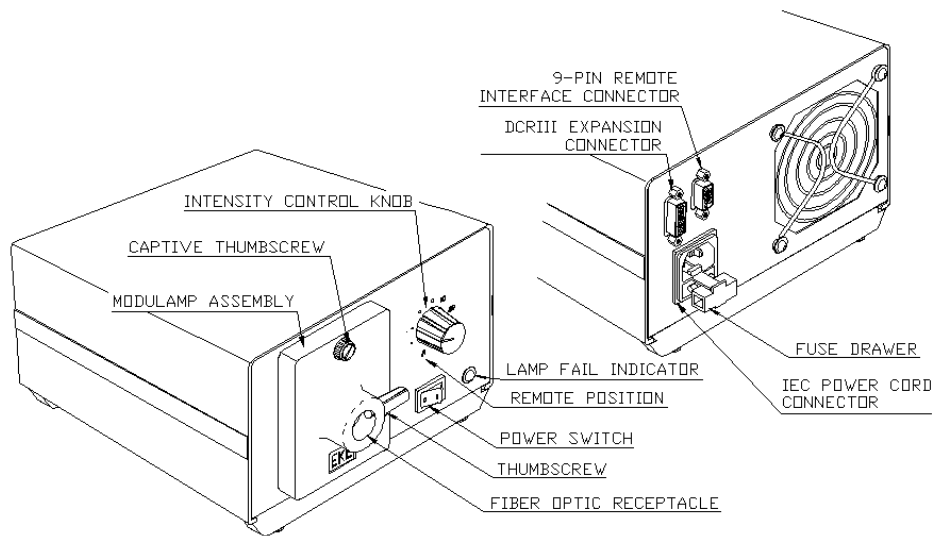
### 2.1. Operation

#### 2.1.1. Universal Voltage Input

The DCR<sup>®</sup> III Plus Light Source was designed to accept line voltage in the range 90 to 264 VAC 47-63 Hz., 224 VA.

#### 2.1.2. Turning the Light Source “on”

1. Make sure that the captive thumbscrew on the Modulamp<sup>®</sup> assembly is firmly tightened.
2. Make sure the power switch on the front panel is in the “off” position.
3. Plug the power cord into the back panel connector.
4. Plug the other end into a power source.
5. Insert any fiber optic component with a SCHOTT compatible light source adapter into the Modulamp<sup>®</sup> receptacle.
6. Tighten the fiber optic positioning thumbscrew.
7. Turn the light source power switch to the “on” position.
8. Adjust the light intensity with the intensity control knob.
9. To turn the unit off, press the power switch to the “off” position.



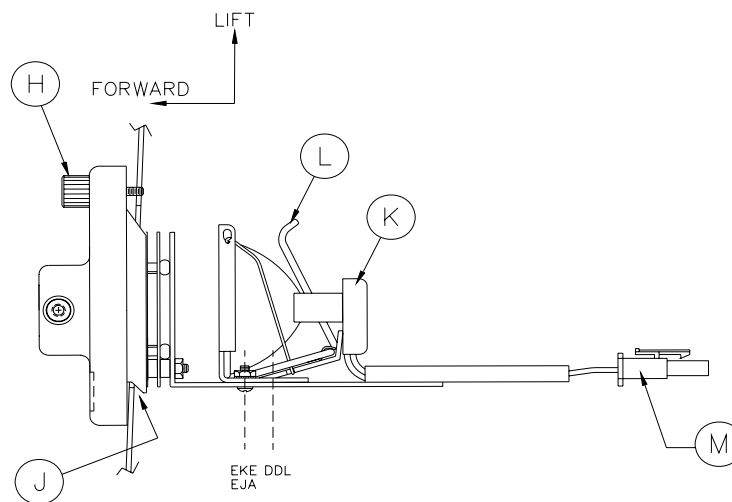
### 2.1.3. Lamp Replacement

1. Turn the power switch to the "off" position, disconnect the power cord from the power source.
2. Remove the fiber optic component.
3. Allow the lamp to cool.
4. Unscrew the Modulamp<sup>®</sup> assembly captive thumbscrew until the head springs forward (H).
5. Pull the top of the Modulamp<sup>®</sup> assembly forward and lift the unit out of the recess (J). Do not pull the assembly beyond the length of the cable assembly.

**CAUTION: Lamp, lamp socket and surrounding surfaces may be hot!**

6. Push back on the lampholder release lever to raise the lamp (L).
7. Gently unplug the ceramic lamp socket (K).
8. Lift the release lever. Insert a new lamp into the lamp holder. Push the lamp all the way down. Be careful not to touch the bulb or the inside of the reflector. Fingerprints may affect the light output.
9. Push the ceramic socket on to the two lamp pins until flush with the lamp base.
10. Return the "Modulamp" assembly into the recess and tighten captive thumbscrew.

For Complete Modulamp<sup>®</sup> Assembly removal and installation, repeat this process, but eliminate steps 7 through 10. You must still observe the handling precautions of Step 9.



## Technical References

### 3.0. General Instructions

#### 3.1. Safety Instructions

1. Read, understand and follow all instructions in this manual.
2. Keep all safety and operating instructions for future reference.
3. Do not block ventilation openings on this unit. Do not impede airflow.
4. Use only standard glass type cleaners. Do not use solvents or petroleum distillates or any volatile or flammable liquids or foams.
5. Never spill liquid on the unit or push objects into ventilation openings.
6. Disconnect power cord when unit will be left unused for long periods of time.
7. Allow the unit to cool down before servicing, which is limited to lamp replacement during the warranty period.
8. Do not service the unit beyond that described in this manual. Return the light source to an authorized SCHOTT service center. For a **Return Material Authorization**, see Section 8.4.

#### 3.2. Product Description

**Congratulations** on the purchase of your DCR<sup>®</sup> III Plus Light Source with built-in RS232 interface. This light source provides cool, intense illumination via remote control. The next generation in DC-regulated light sources, the DCR<sup>®</sup> III Plus can control the intensity of up to three additional DCR<sup>®</sup> III light sources.

The DCR<sup>®</sup> III Plus provides enhanced communication via embedded error checking codes in the unit's programmed settings. The DCR<sup>®</sup> III Plus automatically restores user settings at power up, and can interpret commands from multiple light sources as one unit. New features also include a lamp on/off feature that is independent of intensity control.

The DCR<sup>®</sup> III Plus boasts an IR interference filter for cool illumination, soft start "lamp saver" circuitry, and solid-state dimmer control for continuous dimming. The LED lamp change indicator light located on the front panel signals the user to replace the lamp. Light Source limits light fluctuation to  $\pm 0.5\%$  due to line voltage variation. Additional features include current limiting and transient protection for remote location of the bulb. The DCR<sup>®</sup> III Plus Light Source features a heavy-duty, stackable metal industrial housing with retractable handle. Options include an infinite setting, thirteen-blade diaphragm to reduce intensity while maintaining color temperature. Choice of three, 150 Watt Halogen lamps - EJA, EKE and DDL for intense, uniform illumination. The interchangeable Modulamp<sup>®</sup> Unit offers two lamp positions to maximize individual lamp efficiencies.

### **3.3. Installation Guidelines**

To insure proper operation of the light source, the following conditions must be met:

For indoor use only, Installation Category, II; Pollution degree, 2  
Maximum Operating Altitude: 2000 Meters

Minimum Clearances:	<b>Rear</b>	<b>3" (76 mm)</b>
	<b>Bottom</b>	<b>5/8" (16 mm)</b>
	<b>Sides</b>	<b>1" (25 mm)</b>

Do not block any air vents. Proper ventilation must be guaranteed.

Avoid areas of excessive vibration.

Operate the light source only in an environment where people do not require protective equipment.

**CAUTION:** Dust accumulation will restrict airflow, which can damage the unit. (See Section 2.5 for cleaning recommendations.)

### **3.4. Lamp Specifications**

#### **Lamp Life**

The median life of a lamp is generally defined as the point in time by which half of those lamps being tested fails to light, or its light output falls to 50% or less of its original value. This means that one half of the lamps will fail at sometime before the Median life time is reached and the other half will fail at some point after that time. Actual life may vary depending upon environmental conditions such as thermal shock, vibration, duty cycle, the total number of starts or power control history. The effect of power underrating or overrating on lamp life cannot be accurately predicted.

### **3.5. Cleaning**

The steel housing and the "Lexan" front and back plates have a durable finish that should retain their original luster for many years to come. Cleaning the exposed areas with a commercial glass cleaner will help to maintain the finish.

Press the power switch on the front of the unit to the "off" position. Remove the power cord from the power source. Wipe the exposed areas of the housing and front and back plates with a soft cloth or paper towel moistened with any commercial glass cleaner.

**CAUTION:** Do not use detergents, excess water, treated cloths, harsh cleaning or flammable agents or sprays. If fluid is spilled into the interior, let the unit dry thoroughly before using.

Periodically, visible dust accumulations should be removed using a vacuum or commercially available cans of compressed air. Pay special attention to the fan blades at the rear of the unit, the air vents in the front and bottom of the unit and the Modulamp assembly.



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**Note:** Removal of the Light Source cover prior to the expiration of the warranty period will invalidate the warranty. After the expiration date of the warranty, only a qualified electronic technician should have access to the Light Source with its cover removed.

### 4.0. Intensity Control

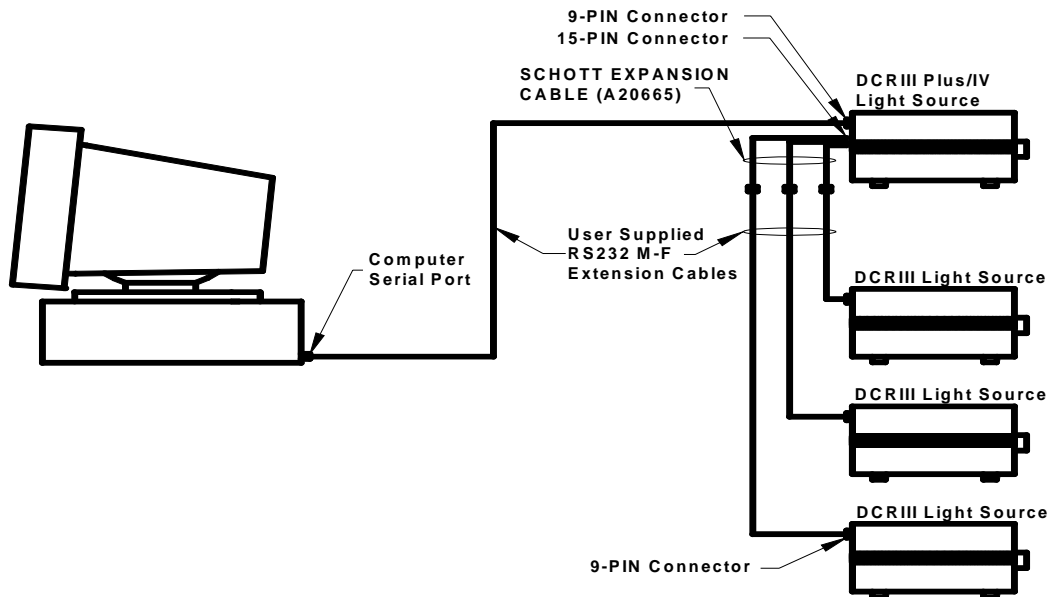
The DCR<sup>®</sup> III Plus Light Source has a power output of up to 150W. Intensity is controlled by means of the intensity control knob on the front panel or remotely via RS232 (see section 6).

Rotating the knob from the full CCW, but not yet detented into the "R" position and the full CW position, will vary the output power from 0-100%. Rotate the knob fully CCW to the "R" Position (detented) to control the intensity via RS232.

Additional intensity control can be achieved using the Modulamp<sup>®</sup> assembly with integrated mechanical iris (either sold separately or specified DCR<sup>®</sup> III Plus with Iris Diaphragm bundle). The iris allows dimming of the lamp output while maintaining color temperature.

### 5.0 DCR<sup>®</sup> III Plus Expansion Connector

The DCR<sup>®</sup> III Plus can control up to 3 attached DCR<sup>®</sup> III's using the RS232 interface and the built-in rear expansion connector. To connect DCR<sup>®</sup> III's to the DCR<sup>®</sup> III Plus, use the SCHOTT A20665 expansion cable and standard DB9 M-F expansion cables (both sold separately). Use standard straight thru RS232 expansion cables of desired lengths to connect the expansion cable to the attached DCR<sup>®</sup> III's.

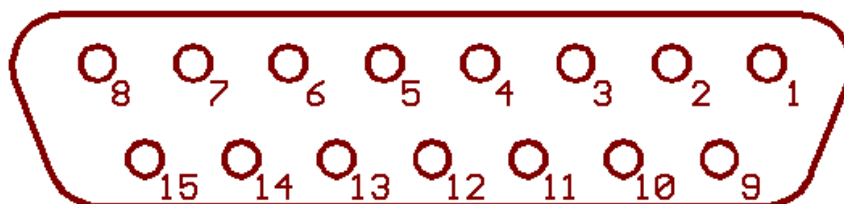


**Connection Example: expanding the DCR III Plus with attached DCR III's**

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For reference, the pin-out of the expansion connector on the rear of the DCR<sup>®</sup> III Plus is given in the following table.

<b>Pin</b>	<b>Description</b>	<b>Pin</b>	<b>Description</b>
1	Lamp Fail - B	9	Shutdown - B
2	Unit 5V - B	10	Analog Control Voltage - B
3	GND - B	11	Lamp Fail - C
4	Shutdown - C	12	Unit 5V -C
5	Analog Control Voltage - C	13	GND - C
6	GND - D	14	Analog Control Voltage - D
7	Unit 5V -D	15	Lamp Fail - D
8	Shutdown - D	-	-



**Rear 15 Pin Female D-Shell**

Letter A designates the DCR<sup>®</sup> III Plus – used only in the command protocol.  
Letters B, C and D represent the three attached DCR<sup>®</sup> III's.

## 6.0 Remote Operation

The DCR<sup>®</sup> III Plus can be operated remotely via a built-in RS232 interface. The front panel power switch must be in the “on” position to operate in the remote mode. Located on the rear of the DCR<sup>®</sup> III Plus Light Source is a 9-pin female D-shell connector. Connect an RS232 DTE equipment to the DCR<sup>®</sup> III Plus light source (DCE) using a 9 pin straight-through cable.

Control of any of the light sources (DCR<sup>®</sup> III Plus and 3 attached DCR<sup>®</sup> III's) is dependent on the position of the light intensity control knob for a particular light source; control of any particular light source is independent on the position of the control knob of the other light sources. The DCR<sup>®</sup> III Plus must have it's control knob in the “R” position in order to control it's lamp via RS232. The attached DCR<sup>®</sup> III's can be controlled via RS232 regardless of the position of the DCR<sup>®</sup> III Plus' control knob.

### 6.1 Command Protocol

The DCR<sup>®</sup> III Plus Light Source can be remotely controlled by any device that can transmit and receive ASCII characters through RS232. Three Baud rates, non-auto

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sensing, can be selected via the communications port: 2400, 9600, and 19200. The format for most command strings are: &yuxxcc<CR> where

& = header character                      u = unit device ID, for unit specific commands ("i" and "l")  
y = command character                    xx = one or two character command parameter  
<CR> = carriage return character "/r"   cc = two character checksum, if activated

The unit device ID is "a" for the DCR<sup>®</sup> III Plus unit and "b", "c", or "d" for attached DCR III units. All units can be controlled with one command by specifying the unit ID as "m".

When sending commands, there are certain characters that must be sent in order for a command to function. Single digit values must be preceded by zeros if the parameter field requires multiple characters. For example, setting the lamp intensity for unit "a" to zero is: &ia00. Commands are not case sensitive. However, the DCR<sup>®</sup> III Plus will first convert received commands to lower case letters then compute the checksum based on the lower case letters. The DCR<sup>®</sup> III Plus buffers ASCII characters until a carriage return is received. The buffer is automatically cleared after a command is processed. Invalid commands are also cleared by receiving a carriage return or after a 10 second command timeout.

### 6.2 Checksums

The checksum is obtained by summing the ASCII byte values (in HEX) of all characters in the command string, discarding all but the lower two bytes (value is logically AND with 0xFF), then encoding both HEX characters as ASCII characters. For example:

&ia?2f            - query channel "a" lamp intensity (ASCII sum = 303 = 0x12f)  
&k0c1            - Turn off checksums (ASCII sum = 193 = 0xc1)  
&f8c             - Check firmware level (ASCII sum = 140 = 0x8c)

The DCR<sup>®</sup> III Plus will not respond to received strings that do not start with the header. When an improper command is sent, the DCR III Plus will respond with a Negative Acknowledgement.

### 6.3 Negative Acknowledgements

Negative acknowledgements are used to indicate that a received command was invalid. The following negative acknowledgements are supported.

- Invalid Checksum: Command string does not match what the DCR III Plus computes from the received command string: &nk
- Invalid Command: Not a recognized command: &ncx  
x = command character received
- Value out of Range: Value of the command parameter exceeds the command's range:  
&nyurxx  
y = command character  
u = unit device ID  
xx = received data  
r = constant character denoting out of range
- Incorrect Mode: Cannot execute in the DCR<sup>®</sup> III Plus current mode (unit "a" not in remote mode or one of the attached units not on). Note that for multiple unit commands individual negative acknowledgements are not transmitted.

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- &nyum
- y = command character
- u = unit device ID
- m = constant character denoting invalid mode
- Invalid unit ID: Unit ID must be either "a", "b", "c", "d", or "m". &nyuc
- y = command character
- u = unit device ID received
- c = constant character denoting invalid unit ID
- Command Timeout: If a command is not completed (i.e., a <CR> is not sent) within 10 seconds of when the first character is received the DCR<sup>®</sup> III Plus will respond with: &ni

### 6.4 Command Summary

Lamp ON/OFF:	"&lux"	u=a,b,c,d,m	x=0,1,?
Set Lamp Intensity:	"&iuxx"	u=a,b,c,d,m	x=00-FF, ?
Bulb Status:	"&bu"	u=a,b,c,d	
Attached Unit Power Status:	"&pu"	u=b,c,d	
Firmware Level	"&f"		
Save Settings After Each change:	"&sx"		x=0,1,?
Restore Settings on Power Up:	"&rx"		x=0,1,?
Restore Settings if &r=0:	"&t"		
Restore Factory Defaults:	"&o"		
Set BAUD Rate:	"&cx"		x=0,1,2,?
Checksums ON/OFF:	"&kx"		x=0,1,?

### 6.5 Command Details

- i. Lamp On/Off: &lux
  - u = unit device ID.
  - "a" is the DCR<sup>®</sup> III Plus,
  - "b", "c", "d" are the attached DCR III units
  - "m" is all units
  - x = command parameter
  - 0 = off
  - 1 = on
  - ? = query value
- ii. Set Lamp Intensity: &iuxx
  - u = unit device ID
  - "a" is the DCR<sup>®</sup> III Plus,
  - "b", "c", "d" are the attached DCR<sup>®</sup> III units
  - "m" is all units
  - xx = command parameter
  - 00 to ff is value in HEX. 00 = off, ff = full brightness
- iii. Check bulb status &bu
  - u = unit device ID
  - "a" is the DCR<sup>®</sup> III Plus,
  - "b", "c", "d" are the attached DCR<sup>®</sup> III units
  - return value:
  - &bu0 - bulb requires replacing
  - &bu1 - bulb OK
- iv. Attached Unit Power Status &pu
  - u = unit device ID
  - "b", "c", "d" are the attached DCR III units
  - return value:
  - &pu0 - unit off
  - &pu1 - unit on
- v. Get firmware version &f

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- vi. Save Settings After Each change: &sx  
Excessive writes to the FLASH memory for frequent changes to lamp intensity and on/off control should be avoided. This setting can be used to disable writing to FLASH memory.
  - x = command parameter
  - 0 = off
  - 1 = on (factory default)
  - ? = query status
- vii. Restore Settings on Power Up: &rx  
By default when the DCR<sup>®</sup> III Plus is turned on the settings for lamp intensity and lamp on/off status is automatically restored for the DCR<sup>®</sup> III Plus and any attached DCR<sup>®</sup> III's. This behavior can be disabled with this setting. Use the Restore Settings command (&t) to restore stored values when &r is set to off
  - x = command parameter
  - 0 = off
  - 1 = on (factory default)
  - ? = query status
- viii. Restore Settings &t  
Restores lamp intensity and lamp on/off status. Useful in conjunction with the &s and &r commands.
- ix. Restore Factory Defaults &o  
Restores factory default settings. Values are:
  - all brightnesses set to zero
  - lamp on/off status set to "on"
  - Save Settings After Each change set to "on"
  - Restore Settings on Power Up set to "on"
  - BAUD Rate set to "9600"
  - Checksums set to "off"
- x. BAUD Rate: &cx
  - x = command parameter
  - 0 = 2400
  - 1 = 9600
  - 2 = 19200
  - ? = query value
- xi. Checksums ON/OFF: &kx
  - x = command parameter
  - 0 = off (factory default)
  - 1 = on
  - ? = query status

## 7.0 Troubleshooting

If you are unsuccessful at resolving the following conditions, contact SCHOTT North America, Inc. See Section 8.4 for a **Return Materials Authorization (RMA)**. Do not attempt to repair the light source. Removing the cover will void the warranty.

Do not attempt to troubleshoot the light source with any remote control device connected. If the light source operates after removal of the remote connection, check your remote set-up.

### Fan operates, but low light output.

1. Check the "CHANGE LAMP WHEN RED" indicator, if green, continue to step two, if red, continue to step three.
2. Check the lamp to ensure that it is fully seated. See Section 2.1.3.
3. Change the lamp.

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**Fan operates, but the light turns on and off.** (The light source is running too hot.)

1. Check your installation against Section 3.3, Installation Guidelines.
2. Check air intakes and exhaust areas for dust or dirt accumulation. Clean per Section 3.5.

**Fan operates, but the light turns briefly on and then off.**

**Fan operates, but no light.**

1. Turn the intensity control knob to 100.
2. Change the lamp using the instructions in section 2.1.3.
3. Examine the lamp socket assembly for damage and continuity.

**Fan does not operate, light is on.**

1. Return to SCHOTT North America, Inc.

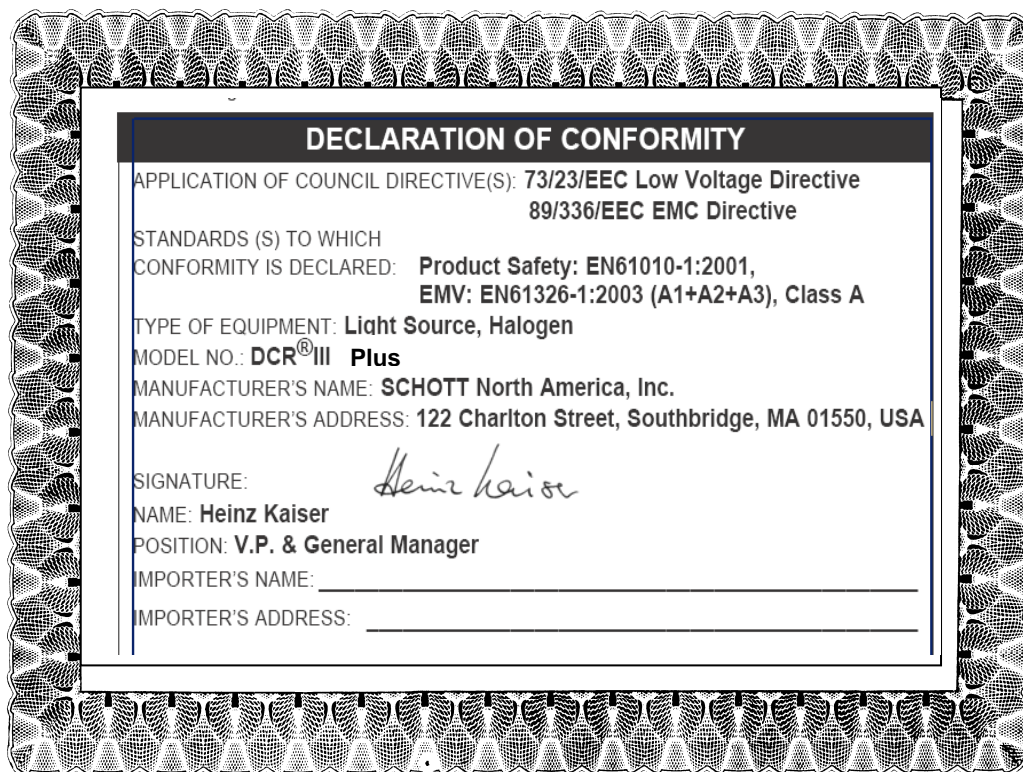
**Fan nor lamp operates.**

1. Make sure the power cord is inserted completely into the IEC connector and also into the correct power source.
2. Check the power cord for damage.
3. Check the fuse.

## 8.0 Appendix

### 8.1 Product Specifications

<b>Physical Dimensions:</b>	Overall Height: 4.62" (177 mm) Overall Width: 7.27" (185 mm) Overall Depth: 8.61" (219 mm) Unit Weight: 4.94 lbs. (2.24 kg) Fiber Receptacle: 0.720" (18.3 mm) diameter
<b>Lamp Type</b>	EKE, DDL and EJA lamps
<b>Environmental Conditions:</b>	Operating Temperature Range: 32 to 113° F, (0 to 45° C) Storage Temperature Range: -13 to 185° F, (-25 to 85° C) Relative Humidity Range: 0 to 95%, Non- condensing For indoor use only Installation Category, II; Pollution degree, 2 Maximum Altitude 2000 Meters
<b>Electrical Specifications:</b>	Input Voltage: 90 – 264 VAC, 47 to 63 Hz Lamp Power: 150 watts Power Consumption: 224 VA
<b>Compliances:</b>	<b>CSA, CSAus, CE</b>



## 8.2 Replacement Parts List

The following replacement parts are available from SCHOTT North America, Inc. to maintain and support **DCR<sup>®</sup> III Plus Light Source**:

<u>Part Number</u>	<u>Description</u>
A09110	EJA Lamp
A08120	EKE Lamp
A08130	DDL Lamp
A08126	Fuse 3 A, 250VAC, 5x20mm
A29506	Lamp Socket Assembly
D20800.040	EMI Cable Clamp
D08375.063	Thumb Screw Assembly, Modulamp
H09050.008	Knob, Control, DCR <sup>®</sup> III Light Source
H09050.045	Knob, Iris
H09063.002	Power Cord Shielded, IEC
D20870.028	Manual, DCR <sup>®</sup> III Plus, Technical Reference

**8.3 Support**

SCHOTT maintains a variety of support services to assist you. For immediate assistance from our Sales Associates or Sales Engineers contact:

<b>For North America:</b>	<b>For Europe</b>
Lighting and Imaging SCHOTT North America, Inc 122 Charlton Street Southbridge, MA 01550-1960 USA	Lighting and Imaging SCHOTT AG Otto-Schott-Strasse 2 55127 Mainz Germany
Phone: 508-765-9744 Fax: 508-765-1299 Email: lightingimaging@us.schott.com	Phone: +49-6131-667796 Fax: +49-6131-667850 Email: lightingimaging@schott.com

Contact your local SCHOTT distributor for an immediate response.

Be sure to have your part number and serial number available, as well as a complete description of the problem or situation for the quickest, most accurate assistance.

**8.4 Service/RMA Policy**

Any service required for any reason must be performed by SCHOTT or an authorized service representative. All service outside warranty will be performed upon the purchaser's request according to normal service charges in effect at the time.

To return any item, whether for warranty repair or chargeable servicing, an RMA number (Return Materials Authorization) must be obtained from SCHOTT. This number must be clearly visible on the shipping label. All shipping must be prepaid.

SCHOTT guarantees all warranty repairs will be completed within two weeks of receipt. All units will ship prepaid using our shipping method of choice. Alternate shipping methods will be shipped freight collect.



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