

## TROUBLE SHOOTING GUIDE, BSS P/S

To identify the destination of the command, each command have to be preceded by **\$xxx** where xxx is the serial number of the device acting as a destination address.

For example

**\$001S** puts the device 001 in standby mode.

To reach every devices on the RS485 chain, commands have to be preceded by the > symbol.

For example

**>S** puts every BSS device on the chain in standby mode

*Note in > mode, data collision may occur if more than one BSS devices are connected to the chain and answer in the same time (to disable answer see ECH command).*

The following commands can be used to control the operation of the BSS. Note that the answer consists of "CRLF" followed by 15 characters. For a better visibility, the space character is replaced by "o" :

RS485 command	Function	Answer message
Computer ----> Laser		Laser ----> Computer
<b>Configuration parameters (Reading)</b>		
<b>X"CRLF"</b>	Software review used	<b>SPECTRA-SC°--</b>
<b>DAT"CRLF"</b>	Date of Software review date/month/year	--/-/-ooooooo
<b>CG"CRLF"</b>	Reads cooling group Temp (°C)	<b>temp. °CG°--°d°°</b>
<b>CGF"CRLF"</b>	Reads cooling group Temp (°F)	<b>temp. °CG°---°F°</b>
<b>T"CRLF"</b>	Time counter (When switch ON hhhh= number hours and mm=minutes)	<b>ct°time°hhhh:mm</b>
<b>R"CRLF"</b>	Reads shutter state	<b>shutter°closed°</b> <b>shutter°opened°</b>

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**ROF"CRLF"**

**P"CRLF"**

Reads open or close the shutter at run **shutt.^at^run^**

Reads stat pump

**CG pump^oooooooo-**

**ECH"CRLF"**

*Note: no response are issued if echo is off*

Reads the echo mode

**echo^on^oooooooo**

### Configuration parameters (Programming)

**SAV1"CRLF"**

Saving the current configuration

**Save^config.^o1**

Valid range: 1 – 1

**RI"CRLF"**

Sets opened or closed the shutter

**shutter^opened^**

Valid range: 0 – 1

**ROFI"CRLF"**

Open or close the shutter at run

**shutt.^at^run^1**

Valid range: 0 – 1 (1 ⇔ Open the shutter at run)

**PI"CRLF"**

Sets control pump

**CG pump^oooooooo1**

Valid range: 0 – 1 (0 ⇔ Stop pump)

**SUC"CRLF"**

Saving the current counter user

**user^ct^saved^o**

**WOR"CRLF"**

Status of laser

**I^a^F^b^S^c^Q^d**

		0	1	2	4	5	6
Interlock	(a)	ok	Fail	-	-	-	-
Flashlamp	(b)	stop	Single	Start	stop	single	Start
		Internal synchro			External synchro		
Simmer	(c)	off	On	-	-	-	-
Q-Switch	(d)	stop	Single	Start	stop	single	Start
		Internal synchro			External synchro		

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"CRLF"

Reads the status of the lamp & QS operating mode

*see lamp & QS  
prog& activation*

**ECH1"CRLF"**

Sets the echo mode

*echo°on°oooooo*

0 : echo off (no response at any command however commands are stored)  
1 : echo on standard mode

### Flashlamp parameters (reading)

**V"CRLF"**

Flashlamp voltage (V)

*voltage°°----°V*

**VA"CRLF"**

Sampled capacitor voltage (V)  
S/H after the end of charge

*voltage°ac----V*

**VT"CRLF"**

Instantaneous capacitor voltage (V)

*voltage°it----V*

**ENE"CRLF"**

Flashlamp energy (J)

*energy°ooo--.-J*

**CAP"CRLF"**

Capacitor value ( $\mu$ F)

*capacity°29.3uF*

**LPM"CRLF"**

Trigger Flashlamp mode

*LP°synch°:°o\_°o*

**F"CRLF"**

Pre-set repetition rate (Hz)

*freq.°°--.--°Hz*

**C"CRLF"**

Lamp shot counter (9 digits)

*ct°LP°-----*

**UC"CRLF"**

Lamp User's shot counter (9 digits)

*cu°LP°-----*

### Flashlamp parameters (Programming)

**LPM0"CRLF"**

Sets trigger Flashlamp mode

*LP°synch°:°o\_°o*

Valid range: 0 – 1 (Internal trigger= 0 or External trigger = 1)

**V1150"CRLF"**

Flashlamp voltage (V)

*voltage°°1150°V*

Valid range: 500 – 1800 &

Vmin < V < Vmax (factory set limits)

<b>F4000"CRLF"</b>	Sets repetition rate (Hz) Valid range: 1 – 9999	<i>freq.</i> °40.00°Hz
<b>UC0"CRLF"</b>	Reset Lamp User's shot counter	<i>cu°LP°000000000</i>
<b>ENE212"CRLF"</b>	Sets flashlamp energy (J) Valid range : 7 – 23 NB: Affects flashlamp voltage value (Depends on capacitor and average voltage values)	<i>energy</i> °°°°°21.2J
<b>CAP293"CRLF"</b>	Sets capacitor value ( $\mu$ F) Valid range : 27 – 33 NB: Affects flashlamp voltage value (Depends on energy and average voltage values)	<i>capacity</i> °29.3 $\mu$ F

M

SIMMER

## Flashlamp (Activation - Deactivation)

<b>A"CRLF"</b>	Activates automatic fire of lamp in the preselected operating mode - lamp internal triggers Q-S programmed in internal trigger	<i>fire°auto</i> °°°°°°°
	- lamp in internal trigger & Q-S programmed in external trigger	<i>fire°auto</i> °°°°°e°
	- lamp in external trigger & Q-S programmed in internal trigger	<i>fire°ext</i> °°°°°°°
	- lamp in external trigger & Q-S programmed in external trigger	<i>fire°ext</i> °°°°°e°
<b>S"CRLF"</b>	Stops automatic internal or external lamp firing - Q-S programmed in internal trigger	<i>standby</i> °°°°°°°
	- Q-S programmed in external trigger	<i>standby</i> °°°°°e°

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<b>M"CRLF"</b>	Set the lamp on Simmer in the preselected operating mode - lamp in internal trigger & Q-S programmed in internal trigger - lamp in internal trigger & Q-S programmed in external trigger	<i>simmer</i> ooooooo <i>simmer</i> ooooooe°
If interlock when Flashlamp activation	water flow Water level lamp connector auxiliary connector external safety interlock temperature too low  cover cabinet opened	<i>water°flow</i> oooo <i>water°level</i> oooo <i>lamp°connector</i> ° <i>aux°connector</i> °° <i>I/O connector</i> <i>tp°CG°&lt;°##°d</i> <i>tp°CG°&lt;°###°F</i> <i>switch°cabinet</i> °
<b>Q-switch parameters (reading)</b>		
<b>QSM"CRLF"</b>	Read Q-S mode	<i>QS°mode°</i> :ooo_-oo
<b>QSF"CRLF"</b>	Read Q-S F/n in auto mode	<i>cycle°rate°F/-</i>
<b>QSP"CRLF"</b>	Read Q-S the number of pulses in burst mode	<i>burst°QS</i> oooo_-
<b>QOF"CRLF"</b>	Turns Q-Switch ON or OFF	<i>QS°at°run</i> oooo_-
<b>CQ "CRLF"</b>	Q-Switch shot counter (9 digits)	<i>ct°QS°-----</i>
<b>UCQ "CRLF"</b>	Q-S User's shot counter (9 digits)	<i>cu°QS°-----</i>
<b>W"CRLF"</b>	Delay between flashlamp & Q-S	<i>delay</i> oooo---°uS

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## Q-switch parameters (Programming)

<i>QSM1</i> "CRLF"	Sets Q-S mode burst Auto = 0, Burst = 1 and Ext = 2	<i>QS°mode° : 000100</i>
<i>QSF10</i> "CRLF"	Set Q-S F/10 Valid range: 1 to 99	<i>cycle°rate°F/10</i>
<i>QSP50</i> "CRLF"	Sets Q-S 50 bursts Valid range: 1 to 999	<i>burst°QS°0000050</i>
<i>QOF1</i> "CRLF"	Turns Q-Switch ON Valid range: 0 – 1 (0=OFF, 1=ON)	<i>QS°at°run°000001</i>
<i>UCQ0</i> "CRLF"	Reset Q-Switch User's shot counter	<i>cu°QS°0000000000</i>
<i>W225</i> "CRLF"	Sets QS-Flash delay in $\mu$ s Valid range : 100 $\mu$ s to 999 $\mu$ s & Wmin < W < Wmax (factory set limits)	<i>delay°0000225°uS</i>

## Q-switch (Activation - Deactivation)

<i>PQ</i> "CRLF"	Start Q-Switch laser emission in the preselected operating mode - lamp activated in internal trigger & Q-S activated in internal trigger - lamp activated in internal trigger & Q-S activated in external trigger - lamp activated in external trigger & Q-S activated in internal trigger - lamp activated in external trigger & Q-S activated in external trigger	<i>fire°auto°000qs°00</i>
		<i>fire°auto°000qse°</i>
		<i>fire°ext°0000qs°00</i>
		<i>fire°ext°0000qse°</i>

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**SQ"CRLF"**

Stop Q-Switch laser emission

- lamp activated in internal trigger    *fire°autooooooo*  
    & Q-S programmed in internal trigger
- lamp activated in internal trigger    *fire°autoooooe°*  
    & Q-S programmed in external trigger
- lamp activated in external trigger    *fire°extooooooo*  
    & Q-S programmed in internal trigger
- lamp activated in external trigger    *fire°extoooooeee°*  
    & Q-S programmed in external trigger

**OQ"CRLF"**

Single pulse Q-S laser emission

in the preselected operating mode

- lamp activated in internal trigger    *fire°autooooqs°°*  
    & Q-S activated in internal trigger
- lamp activated in internal trigger    *fire°autooooqse°*  
    & Q-S activated in external trigger
- lamp activated in external trigger    *fire°extooooqs°°*  
    & Q-S activated in internal trigger
- lamp activated in external trigger    *fire°extooooqse°*  
    & Q-S activated in external trigger

If interlock when  
Q-Switch activation

wait n pulses following flashlamp  
activation

Temp° below than the preset value

Q-switch stop : end of time out  
Only MPS version  
shutter closed

*wait°for°QSoooo*

*tp°CG°<°--°dooo*

*tp°CG°<°###°F*

*time°out°QSoooo*

*interlock°QSooo*

*shutter°closed°*

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## Safety devices

**IF"CR LF"** or **IFI"CR LF"** Test flashlamp safety interlock    **IF1°ab°cd°ef°gh**

<b>a</b>	<b>0</b>	<b>c</b>	<b>d</b>	<b>e</b>	<b>f</b>	<b>g</b>	<b>0</b>
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**a=1** low water flow in the closed laser circuit managed by the cooling group  
**c=1** water level

**d=1** lamp connector head is off  
auxiliary connector head is off    **e=1**  
external safety interlock ( I/O connector)    **f=1**  
switch cover cabinet opened    **g=1**

**IF"CR LF"** or **IF2"CR LF"** Test flashlamp safety interlock    **IF2°ab°cd°ef°gh**

<b>0</b>	<b>0</b>	<b>c</b>	<b>d</b>	<b>0</b>	<b>f</b>	<b>0</b>	<b>0</b>
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**c=1** capacitor loading fail  
**d=1** Simmer fail to initiate

laser water Temp° below than the preset value    **f=1**

**When all safety interlocks of flashlamp are OK :**

**IF"CR LF"**                  Test flashlamp safety interlock                  **IF.°00°00°00°00**

**IQ"CR LF"**                  Test Q-Switch safety devices                  **IQS°ab°cd°ef°gh**

<b>a</b>	<b>b</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>g</b>	<b>0</b>
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**a=1** Emission inhibited for many pulses following flashlamp activation

**b=1** laser water Temp° below than the preset value

shutter closed    **g=1**

**IHG"CRLF"**

Test temperature HG  
If = 0 temperature is OK

**IHGoooooooooo**

**Flashlamp parameters (Reading)**

**VMO"CRLF"**

Average voltage lamp

**voltage°m---°V**

**D"CRLF"**

idle fire

**dis°charg°---S**

**E"CRLF"**

enable fire

**ena°charg°---S**

**SN"CRLF"**

Serial number

**S/Numberoooo**

**Flashlamp parameters (Programming)**

**D10"CRLF"**

idle fire 1.0 seconde

**dis°charg°03.5S**

**D0"CRLF"**

Continue operating

**dis°charg°00.0S**

**E25"CRLF"**

enable fire 2.5 (2.5 secondes)

**ena°charg°03.5S**

**E0"CRLF"**

Continue operating

**ena°charg°00.0S**

**Q-switch parameters (Reading)**

**WMN"CRLF"**

Below limit delay QS

**dly°QS°m°---°uS**

**WMX"CRLF"**

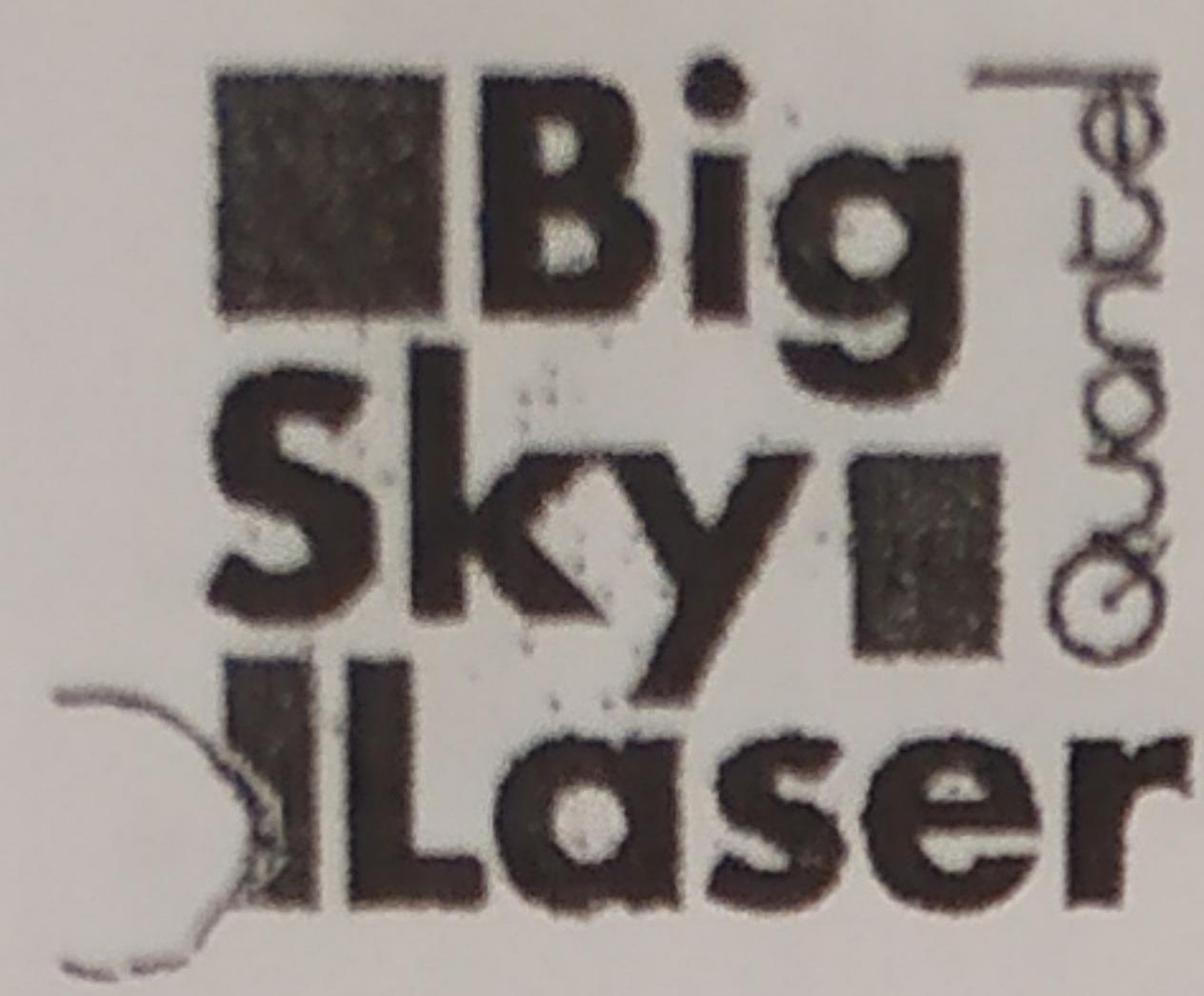
Above limit delay QS

**dly°QS°M°---°uS**

**QSW"CRLF"**

Number of pulses to wait  
after starting the lamp before enabling  
the q-switch

**QS°wait°:oo---**



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### Q-switch parameters (Programming)

<b>WMN150"CRLF"</b>	Below limit delay QS Valid range: 100 – 999 & not configuration 4 & Wmin < W < Wmax	<i>dly°QS°m°150°uS</i>
<b>WMX350"CRLF"</b>	Above limit delay QS Valid range: 100 – 999 & not configuration 4 & Wmin < W < Wmax	<i>dly°QS°M°350°uS</i>
<b>QSW100"CRLF"</b>	Sets the number of pulses to wait after starting the lamp before enabling the Q-Switch	<i>QS°wait°:°°100</i>