Barco RLM W14 Serial (RS-232) Command Protocol

● Interface and Requirements

The RS-232 Commands use only ASCII characters which can be entered using a typical terminal emulator like Windows HyperTerminal with the following setting:

Bits per second: 115200
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None

Note that each input character will be echoed on the terminal by MCU and there is no need to set the local echo "ON" with the terminal setting.

● System Operation commands.

The Operation commands tell the projector what to do. All commands start with 2 letters: "op" for operations commands, and a space [SP] then following a control command then finally the value wants to read, set, increase or decrease.   All commands must end with a carriage return (ASCII hex 0D), shown as [CR] below.   The syntax for operations commands is as follows:

```
op[SP]<operation command>[SP]<Setting Value>[CR]
```

For all but Execute functions the response from the projector will be the command and "= <value>" where <value> is the current value or "NA" if the value is not available.   For Execute functions the response will be the same command.   All responses will be in CAPS.   Please refer to the following table for command list and examples:

System Operation command:

Operation	Commands	Values
Set	= <value>	Makes the unit take that value.

Operation	Commands	Values
Get	?	Asks what the current value is.
Increment	+	Adds 1 to the current value.
Decrement	−	Subtracts 1 from the current value.
Execute	(none)	Performs an action such as a reset.

Motor operation command:

For motor control like lens shift, focus and zoom, the parameters " + " and " - " are defined as follows.

Command item	command	System Action
focus	+ −	+ => Focus Near, - => Focus Far
zoomio	+ −	+ => Zoom out - => Zoom in
vert.offset	+ −	+ => Up - => Down
horiz.offset	+ −	+ => Right - => Left
Lens.center	(execute)	Midposition shift

Get operations command example:

      Input: **op bright ? [CR]**
      System Response: **OP BRIGHT = 100**

Increase & Decrease operations command examples:

      Input: **op bright + [CR]**
      System Response: **OP BRIGHT = 101**

      Input: **op bright − [CR]**
      Response: **OP BRIGHT = 126**

Set operations command example:

      Input: **op bright = 127 [CR]**

System Response: **OP BRIGHT = 127**

Execute command example:

Input: **op auto.img [CR]**
Response: **OP AUTO.IMG**

The list of valid operation commands for Barco RLM W14 are shown in below Table.

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
1-1	input.sel	= ?	0 = HDMI 1 = HDBaseT 2 = RGB D-15 3 = YUV 1 4 = RGBHV/YUV2 5 = Reserve 6 = Reserve 7 = Reserve 8 = SDI/HDSDI/3G 9 = STEREO DVI	Note1; Note3
1-2	input.lock	= ?	0 = Auto 1 = 48 Hz 2 = 50 Hz 3 = 60 Hz	Note2
1-3	auto.powoff	= ?	0 = Off 1 = On	Note1
1-4	auto.powon	= ?	0 = Off 1 = On	
1-5	no.signal	= ?	0 = Logo 1 = Blue 2 = Black 3 = White	Note1
1-6	~~vid.std~~ (Reserve)	= ?	0 = Auto 1 = PAL 2 = SECAM 3 = NTSC	Note2; Note4

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
1-7	auto.imgadj	= ?	0 = Off 1 = Auto 2 = Always	Note2
2-1	contrast	= ? + -	0 - 200	Note2
2-2	Bright	= ? + -	0 - 200	Note2
2-3	~~saturat~~ (Reserve)	= ? + -	0 - 200	Note2; Note4
2-4	~~Tint~~ (Reserve)	= ? + -	0 - 200	Note2; Note4
2-5	sharp	= ? + -	0 - 200	Note2
2-6	nr	= ? + -	0 - 200	Note2
2-7	color.temp	= ?	0 = 3200K 1 = 5400K 2 = 6500K 3 = 9300K 4 = Native	Note2; Note8; Note20
2-8	red.offset	= ? + -	0-200	Note2; Note20
2-9	green.offset	= ? + -	0-200	Note2; Note20
2-10	blue.offset	= ? + -	0-200	Note2; Note20
2-11	red.gain	= ? + -	0-200	Note2; Note20
2-12	green.gain	= ? + -	0-200	Note2; Note20
2-13	blue.gain	= ? + -	0-200	Note2; Note20

Barco RLM W14 Operation Commands				
Command Item	**Operation**	**Commands**	**Values**	**Notes**
2-14	aspect	= ?	0 = 5:4 1 = 4:3 2 = 16:10 3 = 16:9 4 = 1.88 5 = 2.35 6 = Letterbox 7 = Native 8 = Unscaled	Note2; Note5
2-15	h.total	= ? + -	0-200	Note2 ; Note7
2-16	h.pos	= ? + -	0-200	Note2
2-17	h.phase	= ? + -	0-200	Note2; Note7
2-18	v.pos	= ? + -	0-200	Note2
2-19	auto.img	(execute)		Note2
2-20	color.space2	= ?	0 = Auto 1 = YUV HD 2 = YUV STD 3 = RGB-PC (0-255) 4 = RGB-Video (16-235)	Note2
3-1	zoom	= ?	0 = Off 1 = Crop 2 = Zoom	Note2; Note6
3-2	pip.sel	= ?	1 = HDMI 2 = HDBaseT 3 = RGB D-15 4 = YUV 1 5 = RGBHV/YUV2 6 = Reserve 7 = Reserve 8 = Reserve 9 = SDI/HDSDI/3G	Note1; Note9; Please refer to appendix 1 for the valid main/pip source selection

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
3-3	pip.pos	= ?	0 = Top left 1 = Top right 2 = Bottom left 3 = Bottom right 4 = Split L-R	Note1; Note10
3-4	pip	= ?	0 = Off 1 = On	Note1
4-1	lamp.mode	= ?	0 = Economy 1 = Standard 2 = Dimming	Note2
4-2	lamps	= ?	0 = Single 1 = Dual	Note1; Note11
4-3	altitude	= ?	0 = Off 1 = On	Note1
4-4	lamp.pwr	= ?	0-35 (78.3 % ~100 %)	Note2
4-5	lamp1.stat	?	0 = Off 1 = On	Note1
4-6	lamp2.stat	?	0 = Off 1 = On	Note1
5-1	rear.proj	= ?	0 = front 1 = rear	Note1
5-2	ceil.mode	= ?	0 = floor 1 = ceiling	Note1
5-3	zoomio	+ -	+ = Zoom out - = Zoom in	Motor command; Note1
5-4	focus	+ -	+ = Focus Near - = Focus Far	Motor command; Note1
5-5	vert.offset	+ -	+ = Up - = Down	Motor command; Note1
5-6	horiz.offset	+ -	+ = Right - = Left	Motor command; Note1
5-7	dyna.cont	= ?	0 = Off 1 = On	Note2

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
5-8	gamma	= ?	0 = 1.8 1 = 2.0 2 = 2.2 3 = 2.35 4 = 2.5 5 = DICOM SIM.	Note2; Note20
5-9	int.ptrn	= ?	0 = Off 1 = Color Bars 2 = Hatch 3 = Burst 4 = Red 5 = Green 6 = Blue 7 = White 8 = Black 9 = TI-Red 10 = TI-Green 11 = TI-Blue 12 = TI-Ramp	Note1
5-10	color.space	= ?	0 = Native 1 = EBU 2 = SMPTE 3 = Custom	Note2; Note20
5-10a	Lens.center	(execute)		Note1
5-11	h.keystone	= ? + -	-350~+350	Note1; Note15
5-12	v.keystone	= ? + -	-200~+200	Note1; Note15
5-13	warp.rotat	= ? + -	-20 ~ +20 (in ¼°unit)	Note1
5-14	warp.pinbrl	= ? + -	-100 ~ +100	Note1
5-16	warp.tlc.x warp.tlc.y	= ? + -	'x: -192 ~ +192 'y: -120 ~ +120	Note1
5-17	warp.trc.x warp.trc.y	= ? + -	'x: -192 ~ +192 'y: -120 ~ +120	Note1
5-18	warp.blc.x warp.blc.y	= ? + -	'x: -192 ~ +192 'y: -120 ~ +120	Note1

Command Item	Operation	Commands	Values	Notes
5-19	warp.brc.x warp.brc.y	= ? + -	'x: -192 ~ +192 'y: -120 ~ +120	Note1
5-19a	warp.reset	(execute)		Note1
5-19b	w2.recover	(execute)		Note1
5-20	blank.top	= ? + -	0 ~ 360	Note1
5-21	blank.btm	= ? + -	0 ~ 360	Note1
5-22	blank.left	= ? + -	0 ~ 534	Note1
5-23	blank.right	= ? + -	0 ~ 534	Note1
5-23a	blank.rst	(execute)		Note1
5-24	scen.stat	= ?	0 = Off 1 = On	Note1
5-25	scen.wht.top scen.wht.btm	= ? + -	0 ~ 500	Note1;Note16
5-26	scen.wht.left scen.wht.right	= ? + -	0 ~ 800	Note1;Note16
5-27	scen.blk.top scen.blk.btm	= ? + -	0 ~ 32	Note1; Note17; multiple of 8; the adjustable range and 8-multiple restrictions are per Geo Semi' specification.
5-28	scen.blk.left scen.blk.right	= ? + -	0 ~ 32	Note1; Note17; multiple of 4; the adjustable range and 4-multiple restrictions are per Geo Semi' specification.
5-29	scen.red	= ? + -	0 ~ 32	Note1

Barco RLM W14 Operation Commands

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
5-30	scen.green	= ? + -	0 ~ 32	Note1
5-31	scen.blue	= ? + -	0 ~ 32	Note1
5-32	scen.all	= ? + -	0 ~ 32	Note1;Note18
5-33	scen.reset	(execute)		Note1
5-34	scen.adl	= ?	0 = Off 1 = On	Note1
5-35	lens.load	=	1 = Load memroy1 Lens setting 2 = Load memory2 Lens setting 3 = Load memory3 Lens setting	Note1
5-36	lens.save	=	1 = Save Lens setting to memroy1 2 = Save Lens setting to memory2 3 = Save Lens setting to memory3	Note1
5-37	lens.clear	=	1 = Clear memroy1 2 = Clear memory2 3 = Clear memory3	Note1
5-38	lens.cal	(execute)		Note1
6-1	ir.addr	= ?	0 = remote code 1 1 = remote code 2	
6-2	eco.net.pow	= ?	0 = Off (RJ45 Power On) 1 = On (RJ45 Power Off)	
6-3	proj.ctrl (Reserve)	= ?	0 = rs232 1 = network	Note12; Obsolete
6-4	net.ipaddr	= ?	<string>	
6-5	net.subnet	= ?	<string>	
6-6	net.gateway	= ?	<string>	
6-7	net.dhcp	= ?	0 = Off 1 = On	

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
6-8	menu.pos	= ?	0 = Top left 1 = Top right 2 = Bottom left 3 = Bottom right 4 = center	Note1
6-9	startup.logo	= ?	0 = Off 1 = On	
6-10	startup.chime	= ?	0 = Off 1 = On	
6-11	btn.1	= ?	0 = HDMI 1 = HDBaseT 2 = RGB D-15 3 = YUV 1 4 = RGBHV/YUV2 5 = Reserve 6 = Reserve 7 = Reserve 8 = SDI/HDSDI/3G 9 = STEREO DVI	
6-12	btn.2	= ?	0 = HDMI 1 = HDBaseT 2 = RGB D-15 3 = YUV 1 4 = RGBHV/YUV2 5 = Reserve 6 = Reserve 7 = Reserve 8 = SDI/HDSDI/3G 9 = STEREO DVI	

Command Item	Operation	Commands	Values	Notes
Barco RLM W14 Operation Commands				
6-13	btn.3	= ?	0 = HDMI 1 = HDBaseT 2 = RGB D-15 3 = YUV 1 4 = RGBHV/YUV2 5 = Reserve 6 = Reserve 7 = Reserve 8 = SDI/HDSDI/3G 9 = STEREO DVI	
6-14	btn.4	= ?	0 = HDMI 1 = HDBaseT 2 = RGB D-15 3 = YUV 1 4 = RGBHV/YUV2 5 = Reserve 6 = Reserve 7 = Reserve 8 = SDI/HDSDI/3G 9 = STEREO DVI	
6-15	btn.5	= ?	0 = HDMI 1 = HDBaseT 2 = RGB D-15 3 = YUV 1 4 = RGBHV/YUV2 5 = Reserve 6 = Reserve 7 = Reserve 8 = SDI/HDSDI/3G 9 = STEREO DVI	

Barco RLM W14 Operation Commands				
Command Item	**Operation**	**Commands**	**Values**	**Notes**
6-16	trig.1	= ?	0 = 5:4 1 = 4:3 2 = 16:10 3 = 16:9 4 = 1.88 5 = 2.35 6 = Letterbox 7 = Native 8 = Unscaled 9 = Auto	Note1
6-17	trig.2	= ?	0 = 5:4 1 = 4:3 2 = 16:10 3 = 16:9 4 = 1.88 5 = 2.35 6 = Letterbox 7 = Native 8 = Unscaled 9 = Auto	Note1
6-18	auto.src	= ?	0 = Off 1 = On	Note1
6-19	lang	= ?	0 = English 1 = French 2 = Spanish 3 = German 4 = Portuese 5 = Chinese Simplified 6 = Chinese Traditional 7 = Japanese 8 = Korean 9 = Russia	
6-20	~~Osdlite~~ (Reserve)	= ?	~~0 = Advanced menu~~ ~~1 = OSD lite~~	
7-1	model	?	<string>	

	Barco RLM W14 Operation Commands			
Command Item	**Operation**	**Commands**	**Values**	**Notes**
7-2	ser.no	?	<string>	
7-3	sw.ver	?	<string>	Note13
7-4	act.src	?	0 = HDMI 1 = HDBaseT 2 = RGB D-15 3 = YUV 1 4 = RGBHV/YUV2 5 = Reserve 6 = Reserve 7 = Reserve 8 = SDI/HDSDI/3G 9 = STEREO DVI	Note1
7-5	pip.src	?	0 = Off 1 = HDMI 2 = HDBaseT 3 = RGB D-15 4 = YUV 1 5 = RGBHV/YUV2 6 = Reserve 7 = Reserve 8 = Reserve 9 = SDI/HDSDI/3G	Note1
7-6	pixel.clock	?	<string>	In MHz ; Note2
7-7	signal	?	<string>	Note2
7-8	h.refresh	?	<string>	Note2
7-9	v.refresh	?	<string>	Note2
7-10	lamp1.hours	?	<string>	
7-11	lamp2.hours	?	<string>	
7-12	lamp1.reset	(execute)		
7-13	lamp2.reset	(execute)		
7-14	proj.runtime	?	<string>	
7-15	blue.only	= ?	0 = Off 1 = On	Note1

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
7-16	fact.reset	(execute)		
8-1	CS_cust_Rx	= ?	000 ~ 999	P7 Command; Note1; Note20
8-2	CS_cust_Ry	= ?	000 ~ 999	P7 Command; Note1; Note20
8-3	CS_cust_Gx	= ?	000 ~ 999	P7 Command; Note1; Note20
8-4	CS_cust_Gy	= ?	000 ~ 999	P7 Command; Note1; Note20
8-5	CS_cust_Bx	= ?	000 ~ 999	P7 Command; Note1; Note20
8-6	CS_cust_By	= ?	000 ~ 999	P7 Command; Note1; Note20
8-7	CS_cust_Wx	= ?	000 ~ 999	P7 Command; Note1; Note20
8-8	CS_cust_Wy	= ?	000 ~ 999	P7 Command; Note1; Note20
8-9	CS_cust_Cx	= ?	000 ~ 999	P7 Command; Note1; Note20
8-10	CS_cust_Cy	= ?	000 ~ 999	P7 Command; Note1; Note20
8-11	CS_cust_Mx	= ?	000 ~ 999	P7 Command; Note1; Note20

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
8-12	CS_cust_My	= ?	000 ~ 999	P7 Command; Note1; Note20
8-13	CS_cust_Yx	= ?	000 ~ 999	P7 Command; Note1; Note20
8-14	CS_cust_Yy	= ?	000 ~ 999	P7 Command; Note1; Note20
0.1	picture.mute	= ?	0 = Off 1 = On	
0.2	power.on	(execute)		
0.3	power.off	(execute)		
0.4	text.mode	= ?	0 = Off 1 = On	Note14
0.5	status	?	0 = standby 1 = warm up 2 = imaging 3 = cooling 4 = warning	

Barco RLM W14 Operation Commands				
Command Item	**Operation**	**Commands**	**Values**	**Notes**
0.6	errcode	?	0=ErrMsgOverTempInlet 1=ErrMsgOverTempDMD 2=ErrMsgOverTempLamp1 3=ErrMsgOverTempLamp2 4=ErrMsgOverTempBallast1 5=ErrMsgOverTempBallast2 6=ErrMsgFanInitError 7=ErrMsgFan0RotateError 8=ErrMsgFan1RotateError 9=ErrMsgFan2RotateError 10=ErrMsgFan3RotateError 11=ErrMsgFan4RotateError 12=ErrMsgFan5RotateError 13=ErrMsgFan6RotateError 14=ErrMsgFan7RotateError 15=ErrMsgDMDInitFail 16=ErrMsgLampInitFail 17=ErrMsgLampLitFail 18=ErrMsgBallastUartError 19=ErrMsgExGpioFail 20=ErrMsgInterLockOpen 21=ErrMsgGF9450NoResponse 22=ErrMsgSystemI2cFail 23=ErrMsgSoftwareI2cFail 24=ErrMsgEepromFail 25=ErrMsgEdidFail 26=ErrMsgEepVersionFail 27=ErrMsgRstGennum 28=ErrMsgFan8RotateError 29=ErrMsgFan9RotateError 30=ErrMsgFan10RotateError 31=ErrMsgFan11RotateError 32=ErrMsgLamp2LitFail 33=ErrMsgBallast2UartError 34=ErrMsgGtInletTp 35=ErrMsgGtDmdTp 36=ErrMsgInletTempSensorFail 37=ErrMsgDMDTempSensorFail 38=ErrMsgGeoSystemFail 40= ErrMsgFan12RotateError … 51= ErrMsgFan23RotateError 52= ErrMsgFanR1RotateError	
0.7	f.search	= ?	0 = F1 Search 1 = F2 Search (default)	
0.8	sdi.3gccir	= ?	0 = TRS 1 = CCIR	
0.9	DarkTm.sel	= ?	0 = 650 us 1 = 1300 us 2 = 1950 us	Note 19

Barco RLM W14 Operation Commands				
Command Item	Operation	Commands	Values	Notes
0.10	3dsync.inv	= ?	0 = Off 1 = On	Note 19
0.11	3dsync.dly	= ? + -	-32000~32000	Note 19 In microseconds
0.12	3dsync.ref	= ?	0 = Internal 1 = External	Note 19
0.13	~~plgc.rgain~~ (Reserve)	= ?	-100 ~ 100	Note 21
0.14	~~plgc.ggain~~ (Reserve)	= ?	-100 ~ 100	Note 21
0.15	~~plgc.bgain~~ (Reserve)	= ?	-100 ~ 100	Note 21
0.16	~~plgc.reset~~ (Reserve)	(execute)		Note 22

REMARK: An input command will get back with "NA" when the input command is "Not Applicable" in some specific conditions.

Note1: Not applicable in standby mode.

Note2: Not applicable in standby mode or without signal locked.

Note3: Not applicable when picture mute is on.

Note4: Only valid when source is one of Composite, S-Video and RGB-S.

Note5: Native aspect ratio is not applicable when zoom is set to "Zoom", Letterbox aspect ratio is not applicable when the input format is one of formats as listed in appendix 2.

Note6: Selection "Zoom" is not applicable when aspect ratio is set to Native.

Note7: Only applicable when source is one of RGB D-15, YUV1 and RGBHV/YUV2.

Note8: Not applicable when color space is set to custom.

Note9: pip.sel can NOT be set to 0.

Note10: Not applicable when pip is off.

Note11: Not applicable when lamp is cooling.

Note12: Not applicable when eco.net.pow is on.

Note13: Only MCU version number will be read back in standby mode.

Note14: Not applicable when the internal pattern is displayed.

Note15: The summation of the absolute value of h.keystone and v.keystone should not be greater than 350.

Note16: Per Geo Semi's specification, the minimum blend size is 200, values in the range 1 ~ 199 are not allowed.

Note17: Per Geo Semi's specification, black level (position) adjustment will only work with an active white level setting on the corresponding side.

Note18: When scen.red, scen.green, scen.blue values are not equal, the command will get back "NA" in reading.

Note19: Only available when "STEREO DVI" source is active.

Note20: Available for all acvtive source inputs including "STEREO DVI", however the performance not guaranteed under "STEREO DVI" input.

Note21: PLGC adjustment memory scheme is per dark-time, lamp-mode, refresh-rate as the following table.   PLGC adjustment should be made for each of the conditions that will the used in the 3D applications.   The adjusted PLGC values will be memorized and stored based on the current dark-time, lamp-mode setting, and the refresh-rate of the active signal.

Refresh Rate / Dark Time(us)		2D(48Hz, 50Hz, 60Hz)	100Hz	120Hz
1950	Dual-Normal			
	Dual-ECO			
	Single-Normal			
	Single-ECO			
1300	Dual-Normal			
	Dual-ECO			
	Single-Normal			
	Single-ECO			
650	Dual-Normal			
	Dual-ECO			
	Single-Normal			
	Single-ECO			
0	Dual-Normal			
	Dual-ECO			
	Single-Normal			
	Single-ECO			

Note22: All the PLGC adjustment memory in the above matrix will be reset to default.

Appendix 1:

		Main Select					
		HDMI 1	HDBaseT	RGB D-15	YUV 1	RGBHV / YUV 2	SDI / HDSDI/3G
PIP Select	HDMI 1		-	O	O	O	-
	HDBaseT	-		O	O	O	-
	RGB D-15	O	O		-	-	O
	YUV 1	O	O	-		-	O
	RGBHV / YUV 2	O	O	-	-		O
	SDI / HDSDI/3G	-	-	O	O	O	
O	Source Available						
-	NA						

Appendix 2:

Input Format :

640x480_75Hz_VGA:

640x480_85Hz_VGA:

800x600_75Hz_SVGA:

800x600_85Hz_SVGA:

1024x768_75Hz_XGA:

1024x768_85Hz_XGA:

1280x1024_75Hz_SXGA:

1280x1024_85Hz_SXGA:

1400x1050_75Hz

Appendix 3:

The allowable combinations of warp, blanking and ScenergiX were summarized as the following table

X indicates a not-allowed combination

OK indicates a allowed combination

			Keystone	Rotation	Pin/Barrel	4-corner	blanking	ScenergiX White Level: Top/Bottom or Left/Right only	ScenergiX White Level: Blend along corners	ScenergiX Black Level: Black Level
		Keystone		X	X	X	X	X	X	X
		Rotation	X		X	X	X	X	X	X
		Pin/Barrel	X	X		X	X	X	X	X
		4-corner	X	X	X		OK	OK	OK	X
		blanking	X	X	X	OK		OK	OK	OK
ScenergiX	White Level	Top/Bottom or Left/Right only	X	X	X	OK	OK			OK
		Blend along corners	X	X	X	OK	OK			X
	Black Level	Black Level	X	X	X	X	OK	OK	X	