APPENDIX 3. RS232 COMMUNICATION

Serial (RS-232) Interface Requirements

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: 38400→DP-9655 NU HA / 9600→DP-9655 NDPHA
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None

Starting Delta OP Commands:

DP-9655 NU HA→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.

DP-9655 NDPHA→Note that each input character will be echoed on the terminal by MCU and there is 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.
Get	?	Asks what the current value is.
Increment	+	Adds 1 to the current value.

Operation	Commands	Values
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

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 lists of valid operations commands for DP-9655 NU HA are shown in below Table.

DP9655NUHA Operation Commands				
1. Input				
Item	**Operation**	**Commands**	**Values**	**Notes**
1-1	input.sel	= ?	0 = HDMI 1 = DVI 2 = VGA 3 = 5BNC 4 = Component 5 = S-Video 6 = Video 7 = HDBaseT	Note1; Note3
1-2	pattern	= ?	0 = Color Bar 1 = Cross Hatch 2 = Burst 3 = HRamp (TI) 4 = Red (uncorrected) 5 = Green (uncorrected) 6 = Blue (uncorrected) 7 = White (uncorrected) 8 = Black (uncorrected) 9 = Off	Note1
1-2 (for DP)	pattern	= ?	0 = Color Bar 1 = Cross Hatch 2 = Burst 3 = HRamp (TI) 4 = Red (uncorrected) 5 = Green (uncorrected) 6 = Blue (uncorrected) 7 = White (uncorrected) 8 = Black (uncorrected) 9 = Check board 10 = Off	Note1

DP9655NUHA Operation Commands				
1. Input				
Item	**Operation**	**Commands**	**Values**	**Notes**
1-3	color.space	= ?	0 = Auto 1 = YPbPr (Rec. 709) 2 = YCbCr (Rec. 601) 3 = RGB-PC (0-255) 4 = RGB-Video (16-235)	Note2
1-4	no.signal	= ?	0 = Blue 1 = Black 2 = Logo	Note1

DP9655NUHA Operation Commands				
2. Picture				
Item	**Operation**	**Commands**	**Values**	**Notes**
2-1	pic.mode	= ?	0 = High Bright 1 = Presentation 2 = Video	Note1
2-2	contrast	= ? + -	0 - 200	Note2
2-4	bright	= ? + -	0 - 200	Note2
2-5	saturat	= ? + -	0 - 200	Note2; Note4
2-6	tint	= ? + -	0 - 200	Note2; Note4
2-7	gamma	= ?	0 = 2.2 1 = Film 2 = Graphics 3 = Video 4 = PC	Note2
2-7 (for DP)	gamma	= ?	0 = 1.0 1 = 1.8 2 = 2.0 3 = 2.2 4 = 2.35 5 = 2.5	Note2

DP9655NUHA Operation Commands				
2. Picture				
Item	**Operation**	**Commands**	**Values**	**Notes**
2-8-1	color.temp	= ?	0 = Native 1 = 6500K 2 = 7800K 3 = 9300K	Note2; Note8
2-8-2-1	red.offset	= ? + -	0-200	Note2
2-8-2-2	green.offset	= ? + -	0-200	Note2
2-8-2-3	blue.offset	= ? + -	0-200	Note2
2-8-2-4	red.gain	= ? + -	0-200	Note2
2-8-2-5	green.gain	= ? + -	0-200	Note2
2-8-2-6	blue.gain	= ? + -	0-200	Note2
2-9	sharp	= ? + -	0 - 31	Note2
2-10	nr	= ? + -	0 –15 (Noise Reduction)	Note2
2-11	aspect	= ?	0 = 5:4 1 = 4:3 2 = 16:10 3 = 16:9 4 = 1.88:1 5 = 2.35:1 6 = Auto 7 = Native	Note2; Note5
2-12	zoom (Overscan)	= ?	0 = Off 1 = On	Note2; Note6
2-13-1	h.total	= ? + -	0-200	Note2 ; Note7
2-13-2	h.pos	= ? + -	0-200	Note2
2-13-3	h.phase	= ? + -	0-31	Note2; Note7
2-13-4	v.pos	= ? + -	0-200	Note2
2-14	auto.img (Auto Sync)	(execute)		Note2
2-15-1	hsg.r.gain	= ? + -	0-200	Note2
2-15-2	hsg.g.gain	= ? + -	0-200	Note2

DP9655NUHA Operation Commands				
2. Picture				
Item	**Operation**	**Commands**	**Values**	**Notes**
2-15-3	Hsg.b.gain	= ? + -	0-200	Note2
2-15-4	hsg.c.gain	= ? + -	0-200	Note2
2-15-5	hsg.m.gain	= ? + -	0-200	Note2
2-15-6	Hsg.y.gain	= ? + -	0-200	Note2
2-15-7	hsg.r.sat	= ? + -	0-200	Note2
2-15-8	hsg.g.sat	= ? + -	0-200	Note2
2-15-9	Hsg.b.sat	= ? + -	0-200	Note2
2-15-10	hsg.c.sat	= ? + -	0-200	Note2
2-15-11	hsg.m.sat	= ? + -	0-200	Note2
2-15-12	Hsg.y.sat	= ? + -	0-200	Note2
2-15-13	hsg.r.hue	= ? + -	0-200	Note2
2-15-14	hsg.g.hue	= ? + -	0-200	Note2
2-15-15	Hsg.b. hue	= ? + -	0-200	Note2
2-15-16	hsg.c. hue	= ? + -	0-200	Note2
2-15-17	hsg.m. hue	= ? + -	0-200	Note2
2-15-18	Hsg.y. hue	= ? + -	0-200	Note2
2-15-19	hsg.wr.gain	= ? + -	0-200	Note2
2-15-20	hsg.wg.gain	= ? + -	0-200	Note2
2-15-21	Hsg.wb.gain	= ? + -	0-200	Note2

DP9655NUHA Operation Commands				
3. LAMPS				
Item	**Operation**	**Commands**	**Values**	**Notes**
3-1	lamps	= ?	0 = Dual 1 = Lamp1 2 = Lamp2 3 = Single	Note1; Note9
3-2	lamp.mode (Drive)	= ?	0 = Standard 1 = Economy	Note2

DP9655NUHA Operation Commands				
3. LAMPS				
Item	**Operation**	**Commands**	**Values**	**Notes**
3-3	altitude (High Altitude)	= ?	0 = Off 1 = On	Note1
3-4	lamp1.stat	?	0 = Off 1 = On	Note1
3-5	lamp2.stat	?	0 = Off 1 = On	Note1

DP9655NUHA Operation Commands				
4. ALIGNMENT				
Item	**Operation**	**Commands**	**Values**	**Notes**
4-1	proj.mode	= ?	0 = Front 1 = Rear 2 = Ceiling + Front 3 = Ceiling + Rear 4 = Up + Front 5 = Down + Front	Note1
4-2-1	zoomio	+ -	+ => Zoom out - => Zoom in	Motor command; Note1
4-2-2	focus	+ -	+ => Focus Near, - => Focus Far	Motor command; Note1
4-2-3	vert.offset	+ -	+ => Up - => Down	Motor command; Note1
4-2-4	horiz.offset	+ -	+ => Right - => Left	Motor command; Note1
4-3	v.keystone	= ? + -	-30 ~ 30	Note1;
4-4	h.keystone	= ? + -	-30 ~ 30	Note1;

DP9655NUHA Operation Commands				
5. CONTROL				
Item	**Operation**	**Commands**	**Values**	**Notes**
5-1	eco.net.pow	= ?	0 = Network Standby (<6W) 1 = Normal (< 0.5W ECO Mode)	Note1
5-2	auto.powoff	= ?	0 = Off 1 = On	Note1
5-3	auto.powon	= ?	0 = Off 1 = On	Note1
5-4-1	net.ipaddr	= ?	<string>	Note1
5-4-2	net.subnet	= ?	<string>	Note1
5-4-3	net.gateway	= ?	<string>	Note1
5-4-4	net.dhcp	= ?	0 = Off 1 = On	Note1
5-5	startup.logo	= ?	0 = Off 1 = On	Note1
5-5	trig.1	= ?	0 = Off 1 = On	Note1
5-6	dblack	= ?	0 = Off 1 = On	Note1
5-7	lang	= ?	0 = English 1 = Chinese Simplified 2 = Chinese Traditional	Note1
5-7	remote.sensor	= ?	0 = Front / Back 1 = Front 2 = Back 3 = HDBaseT	Note1

DP9655NUHA Operation Commands				
6. SERVICE				
Item	**Operation**	**Commands**	**Values**	**Notes**
6-1	model	?	<string>	Note1
6-2	ser.no	?	<string>	Note1
6-3	sw.ver	?	<string>	Note1
6-4	pixel.clock	?	<string>	In MHz ; Note2
6-5-1	h.refresh	?	<string>	Note2
6-5-2	v.refresh	?	<string>	Note2
6-6-1	lamp1.hours	?	<string>	Note1
6-6-2	lamp2.hours	?	<string>	Note1
6-7	proj.runtime	?	<string>	Note1
6-8	fact.reset	(execute)		Note1

DP9655NUHA Operation Commands				
A. Others				
A-1	power.on	(execute)		Note1
A-2	power.off	(execute)		Note1
A-3	status	?	0 = standby 1 = warm up 2 = imaging 3 = cooling 4 = reset	Note1
A-4	errcode	?	Ref to Appendix A.	Note1
A-5	deint	=?	Switch temperature setting to manual 0 = set temperature manually. 1 = can’t set temperature	Note1
A-6	ti	=?	Set the T1 in Inlet	Note1
A-7	tc	=?	Set the T2 in DMD	Note1
A-8	adc.cal	(execute)	ADC Calibration (VGA, BNC Component each time)	Note1
A-9	adc.rd	?	Get ADC calibration data	Note1

DP9655NUHA Operation Commands				
A. Others				
A-10	f336.ver	?	Ger firmware version of F336	Note1
A-11	blst.ver	?	Ger HW & FW version of Ballast	Note1
A-12	bi.on	=?	0 ~ 100 (Default = 8, unit = 15 min)	Note1
A-13	bi.off	=?	0 ~ 100 (Default = 1, unit = 15 min)	Note1
A-14	bi.cycle	=?	0 ~ 65535 (Default = 8)	Note1
A-15	bi.switch	=?	0 = burn in mode off 1 = burn in mode on	Note1
A-16	fact.sn	=	Set the serial number	Note1
A-17	chevi	= ?	Set/Get the Environment check	Note1
A-18	fans	?	Get Fan and Environment data	Note1
A-19	dlf336	(execute)	Trasfer to download F336 state	Note1
A-20	demsg	= ?	Set/Get the RS232 message output	Note1
A-21	rj45.mac	?	Get the network MAC	Note1
A-22	Hdbaset.rx.ver	?	Get HDBaseT RX version	Note1
A-23	cw.index	= ?	Set/Get Color Wheel Index	Note1
A-24	prerr	(execute)	Ref to Appendix A.	Note1
A-25	upedid	(execute)	Update the default EDID	Note1
A-26	Always.delta	= ?	0 = normal mode 1= always Delta protocol mode	
A-27	dlhdbt	(execute)	Download HDBaseT state	Note1
A-28	fanx(x=1,2,3..10)	?	Get Fan and Environment data	
A-29	fanx(x=1,2,3..10)	= ?	Set Fan speed	

B. “ky” commands

The syntax of “ky” commands is as following:

ky[SP]<Operation>[CR]

Item	Operation	Actions
B-1	power.on	Power on immediately
B-2	power.off	Power off immediately
B-3	menu	Act the same as IR remote control MENU key
B-4	exit	Act the same as IR remote control EXIT key
B-5	enter	Act the same as IR remote control ENTER key
B-6	up	Act the same as IR remote control UP key
B-7	down	Act the same as IR remote control DOWN key
B-8	left	Act the same as IR remote control LEFT key
B-9	right	Act the same as IR remote control RIGHT key
B-10	nop	No operation (just to know projector is alive)

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 YUV.

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 and RGBHV/YUV.

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

Note9: Not applicable when lamp is cooling.

Note10: Not applicable when eco.net.pow is on.

Note12: Only MCU version number will be read back in standby mode.

Note13: Not applicable when the internal pattern is displayed.