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**Requires GRX-PRG or GRX-CI-PRG control interface.

General Information

This document describes the commands available to monitor and operate the *GRAFIK Eye* system through various *GRAFIK Eye* RS232 and Ethernet Interfaces: GRX-RS232, GRX-CI-RS232, GRX-IA-CI-RS232, GRX-CI-NWK-E, GRX-IA-CI-NWK-E, GRX-PRG, and GRX-CI-PRG.

Note: RS232 commands apply to all the above products; PRG commands apply only to GRX-CI-PRG and GRX-PRG, except where specifically noted otherwise (see Set Zone Intensity command).

Communication Settings

RS232 Settings

To configure your device to talk to a *GRAFIK Eye* RS232 Interface, use the data conventions listed below.

9600 BAUD
8 DATA
1 STOP
NO PARITY
NO FLOW CONTROL

If you wish to send these commands from a PC, run the Microsoft Windows® Hyper Terminal program or an equivalent program. Then, select Local Echo, Line Feed, and Carriage Return inbound and outbound. This allows you to see the characters that you are typing as well as keep the responses from overwriting typed characters.

Ethernet Settings

To configure your device to talk to a *GRAFIK Eye* Ethernet Interface, open a Telnet session with the following default IP address, port, subnet, and login information.

Default IP Address: 192.168.250.1
Default Port: 23 (Telnet Port)
Default Subnet: 255.255.255.0
Default Login for Connection 1: 'nwk'
Default Login for Connection 2: 'nwk2'

If you wish to send these commands from a PC, run the Microsoft Windows® Telnet program or an equivalent program.

Typical Interface Wiring

For connection to any *GRAFIK Eye* RS232 Interface, use a cable with a male and female DB9 connector. If you do not have this cable, the following table lists the connections you need to make one.

RS232 I/O Link on GRX-RS232 and GRX-PRG	Typical PC or AV equipment signal	Pin on GRX-CI-RS232 and GRX-CI-PRG standard 9-pin connector	Pin on standard 25-pin connector
1 Common	COM	5	7
2 Data In	TxD	3	2
3 Data Out	RxD	2	3
4 Unused			
5 Unused			

Ethernet Wiring

Wire out of Ethernet port to PC or AV Equipment using CAT5 cable (maximum 328 feet/100 m) to connect to auxiliary equipment. The Ethernet Link LED will light continuously when link is present and will flash when there is link activity. Ethernet network equipment and cables provided by third-party suppliers.

General Information (continued)

GRAFIK Eye Control Units

There are eight addresses (1 to 8) available for Control Units in a *GRAFIK Eye* System. The following terms are applicable for *GRAFIK Eye* 3000 and 4000 Series Control Units.

Scenes

Each Control Unit has 16 scenes plus OFF. For commands that include a scene parameter, the scene is represented by a single character 0 (zero) to G. Characters 1 to 9 represent scenes 1 to 9, characters A to G represent scenes 10 to 16, and 0 represents the OFF scene.

Intensity (int)

Intensity information can range from 0h to 7Fh (**h** indicates a hexadecimal value). For presets, an intensity of D0h assigns a zone to “unaffected.” For all load types, 0h turns it OFF and opens the air-gap relay. A value of 1h closes the relay and sets a minimum light level. A value of 7Fh turns it to maximum light level. If the zone is a non-dim, then any intensity will turn it ON; 0h is required to turn the zone OFF.

The range of intensities are represented as ASCII hexadecimal values 0h to 7Fh. This allows for 128 finite intensities. This range of values is scaled from 0% to 99% for display on the Control Unit or Liaison™ software. To convert intensity percentages to ASCII hexadecimal values, use the following table:

Intensity %	Hex. Value	Intensity %	Hex. Value	Intensity %	Hex. Value
1	2	34	2C	67	56
2	3	35	2D	68	58
3	4	36	2F	69	59
4	6	37	30	70	5A
5	7	38	31	71	5B
6	8	39	32	72	5D
7	9	40	34	73	5E
8	B	41	35	74	5F
9	C	42	36	75	60
10	D	43	38	76	62
11	F	44	39	77	63
12	10	45	3A	78	64
13	11	46	3B	79	66
14	12	47	3D	80	67
15	14	48	3E	81	68
16	15	49	3F	82	69
17	16	50	40	83	6B
18	18	51	42	84	6C
19	19	52	43	85	6D
20	1A	53	44	86	6F
21	1B	54	46	87	70
22	1D	55	47	88	71
23	1E	56	48	89	72
24	1F	57	49	90	74
25	20	58	4B	91	75
26	22	59	4C	92	76
27	23	60	4D	93	78
28	24	61	4F	94	79
29	26	62	50	95	7A
30	27	63	51	96	7B
31	28	64	52	97	7D
32	29	65	54	98	7E
33	2B	66	55	99	7F

General Information (continued)

For Non-Dim Zones, an intensity value of OFF (0) will open the relay and any other intensity will close the relay.

Shade Commands

For shade zones, the intensity value is converted into commands for the shade interface.

Intensity	Action
0h	stop
1h	open
2h	close
3h	preset 1 (Sivoia QED® Shades only)
4h	preset 2 (Sivoia QED® Shades only)
5h	preset 3 (Sivoia QED® Shades only)

Fade times range from 0h to 78h as follows:

0h to 3Bh = seconds (0 to 59 seconds)

3Ch to 78h = minutes (1 to 60 minutes)

Motorized Window Treatments and Non-Dims do not use the fade time value.

General Information (continued)

Accessory Controls

There are 16 addresses (1 to 16) available for Accessory Controls and 8 addresses (1 to 8) available for Motorized Window Treatment Controllers in a *GRAFIK Eye* System. The following terms are applicable for *GRAFIK Eye* 3000 and 4000 series Accessory Controls. Systems that include a GRX-PRG or GRX-CI-PRG are limited to 15 addresses (1 to 15) for Accessory Controls; Address 16 is reserved for the GRX-PRG or GRX-CI-PRG.

DIP Switch

Most *GRAFIK Eye* Accessory Controls are addressed using a set of DIP switches on the Accessory Control. The exceptions are the GRX-DACPI, GRX-PRG, and GRX-CI-PRG, GRX-CI-RS232, GRX-CI-NWK-E, and GRX-RS232 (not using fixed address). Addressing information is included with all *GRAFIK Eye* Accessory Control Installation and Operation Instructions. DIP switches are also used to assign functionality for each Accessory Control. This information can be reported by *Programming Mode: Accessory Control Commands* available through the GRX-PRG and GRX-CI-PRG. For commands that include an Accessory Control parameter, the Accessory Control address is represented by a single character 1 to G. Characters 1 to 9 represent addresses 1 to 9, characters A to G represent addresses 10 to 16. For commands that include a Motorized Window Treatment parameter, the Motorized Window Treatment Control address is represented by a 2-character absolute address, 11 to 18. When a Motorized Window Treatment Control responds, it will respond with its relative address, 1 to 8.

LEDs

The status of LEDs on *GRAFIK Eye* Accessory Controls can be set (ON) and cleared (OFF) using Accessory Control Command **srl** available through the GRX-PRG and GRX-CI-PRG. However, the LED status cannot be read. The srl command controls the outputs on GRX-AV and GRX-IO.

COMMAND FORMATS	
Command Name	Command Description
Description	Description of what the command does
Syntax	[:][command][parameters]<CR>
Allowed Values	: clears input buffer command as shown parameters <i>GRAFIK Eye</i> Units, Zones, or other parameters specific to each command <CR> carriage return executes command
Example	:A123 <CR> Select Scene 1 on <i>GRAFIK Eye</i> Control Units 2 and 3
Additional Information	All commands in this document are presented as ASCII strings. If your equipment does not support transmission of ASCII text, you will need to convert command strings per the requirements of your equipment.

If you are using a touchscreen that can only send hex values, you will need to convert the ASCII command string to a hexadecimal equivalent. To do this, you must determine the hexadecimal representation of the ASCII character you want to send (refer to the ASCII Character Lookup Chart in Appendix A). To make the scene select in the previous example (:A123 in ASCII), the hexadecimal equivalent would be:

ASCII	:	A	1	2	3	<CR>
hexadecimal		3A	41	31	32	33 0D

Note: The command string may contain a maximum of 30 characters.

General Information (continued)

System Responses to Commands

After each command line is entered, the RS232 or Ethernet interface transmits a response to the command. This response always begins as follows:

ASCII	~
hexadecimal	7Eh

Response Strings

The response string will always take one of the following forms:

~(response if applicable) N OK no errors occurred, N is the number of commands executed

Example: ~1 OK

~ERROR #X N OK an error occurred and N number of commands were executed

Example: ~ERROR #6 0 OK

Refer to the Error Codes in Appendix A for explanations of error codes.

End of Response

The response string will always end as follows:

ASCII	<CR><lf>
hexadecimal	0Dh 0Ah

Ethernet Setup Commands

Note: Before using the commands below to change the GRX-CI-NWK-E or GRX-CI-PRG default network settings, you must first change your computer's IP address to 192.168.250.xxx (where xxx is not 1) in order to connect to the device. Ethernet setup commands will not take effect until after the device resets or completes a power cycle. The ':rst<CR>' command will close all connections and reset the device. If you use the Device IP program provided on the CD, you will not need to use the manual commands or change your computer's IP address. The Ethernet connection can be set up over an RS232 connection (GRX-CI-PRG only).

SET IP ADDRESS	
Command Name	sip
Description	Sets the IP address of the device.
Syntax	:sip xxx.xxx.xxx.xxx<CR>
Allowed Values	xxx is a value from 0 to 255; each group is separated by a period (2Fh)
Example	:sip 192.168.250.1<CR> Sets IP device to address 192.168.250.1
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ IP ADDRESS	
Command Name	rip
Description	Returns the IP address of the device.
Syntax	:rip<CR>
Response	~:ip xxx.xxx.xxx.xxx

SET SUBNET MASK	
Command Name	ssm
Description	Sets the Subnet Mask of the device.
Syntax	:ssm xxx.xxx.xxx.xxx<CR>
Allowed Values	xxx is a value from 0 to 255; each group is separated by a period (2Fh)
Example	:ssm 255.255.255.0<CR> Sets Subnet Mask to 255.255.255.0
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ SUBNET MASK	
Command Name	rsm
Description	Returns the Subnet mask of the device.
Syntax	:rsm<CR>
Response	~:sm xxx.xxx.xxx.xxx

Ethernet Setup Commands (continued)

SET GATEWAY	
Command Name	sgw
Description	Sets the gateway address of the device.
Syntax	:sgw xxx.xxx.xxx.xxx<CR>
Allowed Values	xxx is a value from 0 to 255; each group is separated by a period (2Fh)
Example	:sgw 192.168.250.100<CR> Sets gateway address to 192.168.250.100
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ GATEWAY	
Command Name	rgw
Description	Returns the gateway address of the device.
Syntax	:rgw<CR>
Response	~:gw xxx.xxx.xxx.xxx

SET LOGIN NAME	
Command Name	sln
Description	Sets the login name of the device.
Syntax	:sln [connection #] [existing login] [new login]<CR>
Allowed Values	Connection # can be 1 or 2 Login names can be a maximum of 8 characters and cannot include spaces
Example	:sln 2 nwk2 lutron<CR> Changes the password for connection 2 to lutron from nwk2.
Additional Information	The new value will not take effect until a power cycle or a reset occurs.

READ LOGIN NAME	
Command Name	rln
Description	Reads the login name of the device and returns it.
Syntax	:rgw [connection #]<CR>
Allowed Values	Connection # can be 1 or 2
Example	:rln 2<CR>
Response	~:ln 2 lutron

DEVICE RESET	
Command Name	rst
Description	Resets the device. All connections are immediately closed and the device resets.
Syntax	:rst<CR>

RS232 and Ethernet Commands

These commands are for use with all Ethernet and RS232 control interfaces.

CODE REV LEVEL	
Command Name	V
Description	This command requests the revision level of the embedded system's software. It is used for diagnostic purposes and may be needed if you ever contact the Lutron Technical Assistance Hotline for assistance.
Syntax	:V<CR>
Responses	:v high_rev low_rev model
SELECT SCENE	
Command Name	A
Description	Selects any scene on the specified <i>GRAFIK Eye</i> Control Units.
Syntax	:A[scene][control units]<CR>
Allowed Values	Scene is from 0 to G Control Unit 1-8 (Control Units on link)
Examples	:A21<CR> Select scene 2 on Control Unit A1 :AG78<CR> Select scene 16 on Control Units A7 and A8
SCENE LOCK	
Command Name	SL
Description	Place the specified <i>GRAFIK Eye</i> Control Units in or out of Scene Lock.
Syntax	SL[+ or -][Control Units]<CR>
Allowed Values	+ add a control unit to scene lock; - remove a control unit from scene lock Control Unit 1-8 (Control Units on link)
Examples	:SL<CR> release all Control Units from scene lock :SL-1<CR> release only Control Unit 1 from scene lock :SL+36<CR> lock out Control Units 3 and 6
Additional Information	Setting Scene Lock from an RS232 or Ethernet Interface can be cleared only by the same Interface.
REQUEST SCENE STATUS	
Command Name	G
Description	Report the scene status of all Control Units on the link.
Syntax	:G<CR>
Responses	~:ss [S1][S2][S3][S4][S5][S6][S7][S8] [Sx]: scene currently selected on Control Unit at address x ~:ss 1AMMMMMM Control Unit at address 1 is in scene 1, Control Unit at address 2 is in scene 10, Control Units at addresses 3 to 8 are missing (M)

SEQUENCE	
Command Name	SQ
Description	Sequence scenes on the specified <i>GRAFIK Eye</i> Control Units. The range of scenes sequenced (1 to 4, or 5 to 16) is set by DIP switch 4 on the RS232/Ethernet Interface.
Syntax	SQ[+ or -][Control Units]<CR>
Allowed Values	+ add Control Units to sequencing - remove Control Units from sequencing Control Unit 1-8 (Control Units on link)
Examples	:SQ<CR> release all Control Units from sequence mode :SQ-3<CR> release only Control Unit 3 from sequencing :SQ+68<CR> add Control Units 6 and 8 to sequencing
Additional Information	Setting Sequence from an RS232 or Ethernet Interface can be cleared only by the same Interface.

ZONE LOCK	
Command Name	ZL
Description	Zone lock out the specified <i>GRAFIK Eye</i> Control Units.
Syntax	ZL[+ or -][Control Units]<CR>
Allowed Values	+ add Control Units to zone lock - remove Control Units from zone lock Control Unit 1-8 (Control Units on link)
Examples	:ZL<CR> release all Control Units from zone lock :ZL-1<CR> release only Control Unit 1 from zone lock :ZL+36<CR> add Control Units 3 and 6 to zone lock
Additional Information	Setting Zone Lock from an RS232 or Ethernet Interface can only be cleared by the same Interface.

ZONE LOWER	
Command Name	D
Description	Zone lower ramps down specific zones on a single <i>GRAFIK Eye</i> Control Unit.
Syntax	D[Control Unit][zones]<CR>
Allowed Values	Control Unit 1-8 (Control Units on link) 0-8 Zones to ramp down
Examples	:D5<CR> ramp down all zones on Control Unit 5 :D3124<CR> ramp down zones 1, 2, and 4 on Control Unit 3
Additional Information	This command will not affect shade zones.

ZONE LOWER STOP	
Command Name	E
Description	This command is a shortcut for stopping all ramping down on all Control Units.
Syntax	:E
Additional Information	This command will not affect shade zones.

RS232 and Ethernet Commands (continued)

ZONE RAISE	
Command Name	B
Description	Zone raise ramps up specific zones on a single <i>GRAFIK Eye</i> Control Unit.
Syntax	D[Control Unit][zones]<CR>
Allowed Values	Control Unit 1-8 (Control Units on link) 0-8 Zones to ramp down
Examples	:B5<CR> ramp up all zones on Control Unit 5 :B3124<CR> ramp up zones 1, 2, and 4 on Control Unit 3
Additional Information	This command will not affect shade zones.

ZONE RAISE STOP	
Command Name	C
Description	This command is a shortcut means of stopping all ramping up on all Control Units.
Syntax	:C<CR>
Additional Information	This command will not affect shade zones.

SET CONTROL UNIT ZONE INTENSITIES	
Command Name	szi
Description	This command changes the intensity of the given zones to the new values in the given fade time. The scene number selected will change to 17 (H from an :A command), but preset data will not be changed. Parameters must be separated by a space (20h).
Syntax	szi [Control Unit] [ft] [Int1] [Int2] [Int3] [Int4] [Int5] [Int6] [Int7] [Int8]<CR>
Allowed Values	Control Unit 1-8 (Control Units on link) ft (fade time) 0h to 3Bh = seconds (0 to 59) 3Ch to 78h = subtract 3Bh for minutes (1 to 60) Intx (intensity for zone x) 0h to 7Fh * to remain the same Non-Dim zones: 0 = zone off, 1 to 7F = zone on Shade zones: 0 = STOP 1 = Open 2 = Close 3 = Preset 1 (Sivoia QED® only) 4 = Preset 2 (Sivoia QED® only) 5 = Preset 3 (Sivoia QED® only)
Examples	:szi 5 A 20 20 * 20 20 20 set zones 1, 2, 4, 5, and 6 on control unit at address 5 to 25% with a 10-second fade; don't change zone 3 Note: It is not necessary to send all 8 values, but placement and order is important. Use * for zones that are to remain the same. In the example above, zone 3 does not change, but an * is required as a placeholder to send values for zones 4 and above.
Additional Information	Requires <i>GRAFIK Eye</i> 3500 or 4500 Series control unit and is not applicable to GRX-RS232 control interface. Refer to Control Units, Intensity in the General Information section for details on converting decimal values to hexadecimal values.

RS232 and Ethernet Commands (continued)

READ CONTROL UNIT ZONE INTENSITIES													
Command Name	rzi												
Description	This command returns the zone intensities on a specified Control Unit. Parameters must be separated by a space (20h).												
Syntax	rzi [Control Unit]<CR>												
Response	~:zi [Control Unit] [Int1] [Int2] [Int3] [Int4] [Int5] [Int6] [Int7] [Int8]												
Allowed Values	Control Unit 1-8 (Control Units on link) Intx (intensity for zone x) 0h to 7Fh												
Example	:rzi 5<CR> return zone intensities for Control Unit at address 5												
Response	<p>~:zi 1 20 40 60 7F 4 5 6 7</p> <p>Current intensities for zones at address 1 are:</p> <table> <tr> <td>20h</td> <td>25%</td> <td>Zone 1</td> </tr> <tr> <td>40h</td> <td>50%</td> <td>Zone 2</td> </tr> <tr> <td>60h</td> <td>75%</td> <td>Zone 3</td> </tr> <tr> <td>7Fh</td> <td>99%</td> <td>Zone 4</td> </tr> </table> <p>* not present Zones 5 to 8</p> <p>*Note: Eight zone intensities will always be returned. For zones that do not exist on the control unit, the zone number minus 1 is returned as a placeholder.</p> <p>Note: For non-Dim zones, 0 = zone off, 1 to 7F = zone on.</p> <p>If Motorized Window Treatments are moving, the following zone intensities are valid.</p> <ul style="list-style-type: none"> 5Eh = STOP 15h = Open 2Dh = Close 71h = Preset 1 (Sivoia QED® Shades only) 72h = Preset 2 (Sivoia QED® Shades only) 73h = Preset 3 (Sivoia QED® Shades only) <p>If Motorized Window Treatments are stopped, the following zone intensities are valid.</p> <ul style="list-style-type: none"> 5Eh = STOP 5Fh = Open 60h = Close 61h = Preset 1 (Sivoia QED® Shades only) 62h = Preset 2 (Sivoia QED® Shades only) 63h = Preset 3 (Sivoia QED® Shades only) <p>Note: The system assumes that the Motorized Window Treatments are moving for 2 minutes. These values are valid 2 minutes after the last command.</p>	20h	25%	Zone 1	40h	50%	Zone 2	60h	75%	Zone 3	7Fh	99%	Zone 4
20h	25%	Zone 1											
40h	50%	Zone 2											
60h	75%	Zone 3											
7Fh	99%	Zone 4											
Additional Information	Refer to Control Units, Intensity in the General Information section for details on converting decimal values to hexadecimal values.												

PRG Commands (continued)

REPORT SCHEDULE	
Command Name	RS
Description	Report the schedule to be run for the current day.
Syntax	RS<CR>
Response	:rs [schedule] Schedule variables returned: 0 = suspend schedule 1 = weekday schedule 2 = weekend schedule

REPORT SUNRISE/SUNSET	
Command Name	RA
Description	Report the sunrise and sunset times for today's date. This time is based on system location as configured by a download from <i>GRAFIK Eye Liaison™</i> software. Response parameters will be separated by a space (20h).
Syntax	RA<CR>
Response	~:ra [rise_hr] [rise_min] [set_hr] [set_min] rise_hr: hour of sunrise (0 to 24) rise_min: min of sunrise (0 to 59) set_hr: hour of sunset (0 to 24) set_min: min of sunset (0 to 59) ~:ra 6 13 18 26: sunrise will be 6:13 a.m., sunset will be 6:26 p.m.

SUPER SEQUENCE START	
Command Name	QS
Description	A super sequence created and downloaded from <i>GRAFIK Eye Liaison™</i> software can be started from any RS232 or Ethernet Interface. The super sequence will begin at the first event.
Syntax	:QS<CR> Starts the super sequence at the first step

SUPER SEQUENCE PAUSE	
Command Name	QP
Description	A super sequence created and downloaded from <i>GRAFIK Eye Liaison™</i> software can be paused from any RS232 or Ethernet Interface.
Syntax	:QP<CR> Stops the super sequence at the current step

SUPER SEQUENCE RESUME	
Command Name	QC
Description	A super sequence created and downloaded from <i>GRAFIK Eye Liaison™</i> software that has been paused can be resumed from any RS232 or Ethernet Interface.
Syntax	:QC<CR> Resume the super sequence at the next step.
Additional Information	If the super sequence has not been started, QC will start the super sequence at the first step.

PRG Commands (continued)

REPORT SUPER SEQUENCE STATUS	
Command Name	Q?
Description	The status of the super sequence created and downloaded from <i>GRAFIK Eye Liaison™</i> software can be reported from the GRX-PRG or GRX-CI-PRG. Parameters will be separated by a space (20h).
Syntax	:Q?<CR> Report the status of the super sequence.
Response	:s? [status] [next] [min] [sec] status: R = running, S = stopped next: next step in super sequence min minutes until next step sec seconds until next step ~:s? R 5 0 20 the super sequence is running, Step 5 will occur in 20 seconds

SET TIMECLOCK STATUS	
Command Name	ate
Description	Timeclock events can be enabled and disabled on an individual Control Unit basis. Control Units that have timeclock events disabled will not respond to timeclock events as long as they are disabled. Parameters must be separated by a space (20h).
Syntax	ate [bitmap]<CR>
Allowed Values	bitmap: binary expansion of the hexadecimal value of what Control Units to enable and disable timeclock events at (bit 0 = Unit 1, bit 7 = Unit 8; bit 0 is the least significant bit at the right end of the number))
Examples	:ate 27<CR> 00100111 enable timeclock at Control Units 6, 3, 2, 1 disable timeclock at Control Units 8, 7, 5, 4 :ate 0C<CR> 00001100 enable timeclock at Control Units 4, 3 disable timeclock at Control Units 8, 7, 6, 5, 2, 1 :ate FF<CR> enable timeclock events on all Control Units

REPORT TIMECLOCK STATUS	
Command Name	at?
Description	Control Units that have timeclock events disabled will not respond to timeclock events as long as they are disabled.
Syntax	:at?<CR> Report the status of the timeclock.
Response	~:at [bitmap] bitmap: hex bitmap of what Control Units to enable and disable timeclock events at (bit 0 = Unit 1, bit 7 = Unit 8) ~at27 = 00100111 timeclock enabled at Control Units 6, 3, 2, 1 timeclock disabled at Control Units 8, 7, 4 ~at0C = 00001100 timeclock enabled at Control Units 4, 3 timeclock disabled at Control Units 8, 7, 6, 5, 2, 1

PRG Commands (continued)

The following commands require *GRAFIK Eye* 3500, 4500, or Grafik Integrale™ 3500 Series Control Units.

Programming Mode: Control Unit Commands

All Programming Mode Commands require the GRX-PRG or GRX-CI-PRG Interface Accessory Control be in programming mode.

START PROGRAMMING MODE	
Command Name	spm
Description	This command places the GRX-PRG or GRX-CI-PRG unit into programming mode. It removes any other Control Units or Accessory Controls from programming mode. The GRX-PRG unit will remain in programming mode until removed using the “epm” command or until no commands are sent to the GRX-PRG or GRX-CI-PRG unit for 10 minutes.
Syntax	:spm<CR> Start programming mode
Additional Information	It is necessary to place the unit into programming mode to access the Read and Program commands below.

END PROGRAMMING MODE	
Command Name	epm
Description	This command will remove the GRX-PRG or GRX-CI-PRG unit from programming mode, thus allowing normal system operation.
Syntax	:epm<CR> End programming mode

PRG Commands (continued)

READ CONTROL UNIT INFO	
Command Name	rmu
Description	This command will return the type of Control Unit and its code revision. Parameters must be separated by a space (20h).
Syntax	rmu [Control Unit]<CR>
Allowed Values	Control Unit 1 to 8
Example	:rmu 1<CR> get details of unit at address 1
Response	<pre>~:mu [main_unit] [type] [zones] [code_rev] [units_inv] [temp_mode] [pll] [4q] [ir_addr]</pre> <p>main_unit Control Unit for which details are returned type 35 or 45 (3500 series or 4500 series) zones number of zones on the unit, 2h to 18h (2 to 24 zones) code_rev revision level 00h to 7Fh units_inv bitmap of what Control Units are controlled by this main unit (bit 0 = Unit 1, bit 7 = Unit 8) temp_mode 0 to 4, temporary mode of Control Unit (Sd, Sb, Sn, 4S, bd) pll - For 3500 series: 0 = generator mode, 1 = PLL mode, 2 = automatic power mode selection - For 4500 series: 0 - For 4516, 4524: 11 = 1st address of multi-address unit 12 = 2nd address of multi-address unit 13 = 3rd address of multi-address unit This value is undefined in all units after GRX units 6-0 and all Integrale units. 4q - bitmap of 4Q functions now active on this control bit 4 = unit in fade override bit 3 = unit in scene lock bit 2 = unit in zone lock bit 1 = unit in sequence mode bit 0 - set = seq type 5 to 16, clr = seq type 1 to 4 ir_addr - IR address variable 0h to FFh</p> <pre>~:mu 1 35 4 51 6 1 1 0 0 address 1 is a GRX-3504, code rev = 5.1, talks to Control Units at address 2 and 3, the temporary mode is Sb, PLL option is on</pre>

PRG Commands (continued)

READ LOAD TYPES	
Command Name	rlt
Description	This command will return the load types assigned to each zone of the Control Unit.
Syntax	rlt [Control Unit]<CR>
Allowed Values	Control Unit 1 to 8
Example	:rlt 7<CR> get load types of zones on unit at address 7
Response	<pre>~:lt [main_unit] [lt1] [lt2] [lt3] [lt4] [lt5] [lt6] [lt7] [lt8] main_unit Control Unit for which load types are returned ltx load type returned (x is the zone number)</pre> <p>~:lt 7 1 1 2 2 1 1 1 1 load types for the Control Unit at address 7 are: INC, MLV Zones 1, 2, 5, 6, 7, 8 FDB, ELV Zones 3, 4</p>
Additional Information	The response will always include load types for 8 zones. For Control Units with fewer than 8 zones, load type 1 will be returned for zones exceeding the number of zones on the Control Unit. See page 4 for load types table.

Load Types Supported by Control Units	GRAFIK Eye 3000 Series	Grafik Integrale™	GRAFIK Eye 4000 Series*
1 = Incandescent, MLV	X	X	X
2 = FDB	X	X	ext
3 = Neon	X	X	ext
4 = Non-dim last ON, first OFF	X	X	X
5 = Non-dim first ON, first OFF	X	X	X
6 = Tu-Wire®	5-5 +		ext
7 = ELV Reverse Phase		X	ext
8 = Auto Phase (REV/FOR)		X	ext
9 = 0-10 Fluorescent		X	ext
10 = DSI Fluorescent		X	ext
11 = DALI Fluorescent		X	ext
12 = PWM Fluorescent		X	ext
13 = Unused			
14 = Unused			
15 = Unused			
16 = AC Shade	7-1 +		7-1 +
17 = Sivoia QED® Shade	7-1 +		7-1 +
* Set Load Type to 1.			
+Key: X = all versions; X-X + = all versions of that code rev or higher; ext = set by external module and circuit selector.			

PRG Commands (continued)

READ LOW ENDS	
Command Name	rle
Description	This command will return the low end values assigned to each zone of the Control Unit. See the table below.
Syntax	rle [Control Unit]<CR>
Allowed Values	Control Unit 1 to 8
Example	:rle 7<CR> get low ends of zones on unit at address 7
Response	<pre>~:le [main_unit] [le1] [le2] [le3] [le4] [le5] [le6] [le7] [le8] main_unit Control Unit for which low ends are returned lex low end returned (x is the zone number) 7Fh = Non-dim (has no low end setting)</pre> <pre>~:le 7 4 4 3C 3C 4 4 4 4 low ends for the Control Unit at address 7 are: 4h Zones 1, 2, 5, 6, 7, 8 3Ch Zones 3, 4</pre>
Additional Information	The response will always include low ends for 8 zones. For Control Units with fewer than 8 zones, low end for incandescent will be returned for zones exceeding the number of zones on the unit. Other values represent the low-end setting that depends on the load type. (1 = lowest light level possible; numbers greater than 1 represent higher low-end light settings). Each load type has a different maximum low-end value (highest low-end light level). Also, each load type has a default low-end value that is set automatically whenever a load type is changed. The lowest low-end level (least light) for each load type has a value of 1. Each load type has a different max low-end trim value (highest light).

GRAFIK Eye 3000 Series Control Unit	Low End (LE) Range (higher number = brighter light)	Default Value
Incandescent	1 to 50h	3h
FDB	1 to 50h	39h
Tu-Wire®	1 to 50h	6h
Neon/CC	1 to 50h	2Ah
Grafik Integrale™	Low End (LE) Range (higher number = brighter light)	Default Value
Auto	1 to 5Fh	Ah
ELV	1 to 5Fh	Ah
MLV	1 to 5Ah	7h
FDB	1 to 5Ah	38h
0-10	1 to 38h	Ah
DSI	1 to 38h	Ah
DALI	1 to 38h	Ah
PWM	1 to 38h	Ah
Neon/CC	1 to 6Eh	28h
Values for shade and non-dim zones are undefined. Command not available on GRAFIK Eye 4000 Series control units.		

PRG Commands (continued)

READ HIGH ENDS	
Command Name	rhe
Description	This command will return the high end values assigned to each zone of the Control Unit. Parameters will be separated by a space (20h). This command is valid only on units with <i>GRAFIK Eye</i> software version 7.0 or higher and Grafik Integrale™. See the table below.
Syntax	rhe [Control Unit]<CR>
Allowed Values	Control Unit 1 to 8
Example	:rhe 7<CR> get high ends of zones on unit at address 7
Response	~:rhe [main_unit] [he1] [he2] [he3] [he4] [he5] [he6] [he7] [he8] main_unit Control Unit for which high ends are returned hex high end returned (x is the zone number) 7Fh = Non-dim (has no low end setting) ~:rhe 7 4 4 3C 3C 4 4 4 4 high ends for the Control Unit at address 7 are: 4h Zones 1, 2, 5, 6, 7, 8 3Ch Zones 3, 4
Additional Information	The response will always include high ends for 8 zones. For Control Units with fewer than 8 zones, high end for incandescent will be returned for zones exceeding the number of zones on the unit. The highest high-end level (most light) for each load type has a value of 1. Each load type has a different max high-end trim value (lowest light). There is also a default high end for each type that is set automatically each time a load type is changed. This value is 0.

GRAFIK Eye 3000 Series Control Unit	High End (HE) Range (higher number = brighter light)	Default Value
Incandescent	1 to 50h	3h
FDB	1 to 50h	39h
Tu-Wire®	1 to 50h	6h
Neon/CC	1 to 50h	2Ah
Grafik Integrale™	High End (HE) Range (higher number = brighter light)	Default Value
Auto	1 to 55h	2Dh
ELV	1 to 55h	1Eh
MLV	1 to 5Ch	9h
FDB	1 to 5Ch	38h
0-10	1 to 38h	Ah
DSI	1 to 38h	Ah
DALI	1 to 38h	Ah
PWM	1 to 38h	Ah
Neon/CC	1 to 55h	45h

Values for shade and non-dim zones are undefined.
 Command not available on *GRAFIK Eye* 4000 series control units.

PRG Commands (continued)

READ PRESET SCENE	
Command Name	rps
Description	This command will return the preset scene data for each zone of the Control Unit. Parameters must be separated by a space (20h).
Syntax	rps [Control Unit] [scene]<CR>
Allowed Values	Control Unit 1 to 8 Scene scene number 0h (Off) to 10h (Scene 16)
Example	:rps 1 2<CR> return preset for scene 2 on Control Unit at address 1
Response	<pre>~:ps [Control Unit] [scene] [ft] [Int1] [Int2] [Int3] [Int4] [Int5] [Int6] [Int7] [Int8] Control Unit Control Unit address scene scene number 0h (Off) to 10h (Scene 16) ft fade time 0h to 3Bh = seconds (0 to 59 seconds) 3Ch to 78h = subtract 3Bh for minutes (1 to 60 minutes) Intx intensity for zone x 0h to 7Fh, D0h is unaffected Refer to Control Units, Intensity in the General Information section for details on converting decimal values to hexadecimal values. ~:ps 1 2 5 20 40 60 7F D0 D0 40 40 scene 2 at address 1 is programmed for: 5 second fade 25% Zone 1 50% Zone 2 75% Zones 3, 7, 8 99% Zone 4 Unaffected Zones 5, 6</pre>
Additional Information	<p>The response will always return 8 intensities. For Control Units with fewer than 8 zones, disregard intensities exceeding the number of zones on the unit.</p> <p>For AC shade zones valid values for intensity are: D0h = unaffected 1 = OPEN 2 = CLOSED</p> <p>For Sivoia QED® shade zones, valid values are: D0h = unaffected 1 = OPEN 2 = CLOSED 3 = preset 1 4 = preset 2 5 = preset 3</p>

PRG Commands (continued)

STOP COMMUNICATION LINK	
Command Name	scl
Description	This command will stop all link polling and allow the RS-232 unit to communicate with and program the circuit selector in each dimmer panel. Programming communication to the circuit selector is documented in the GRAFIK 6000® product documentation. If valid dimmer panel commands are not present on the link for 5 seconds, the link will resume polling.
Syntax	:scl<CR> Stop the communication link to the dimmer panels.

RESTART COMMUNICATION LINK	
Command Name	rcl
Description	This command will allow link polling to resume.
Syntax	:rcl<CR> restart link polling with the dimmer panels

PROGRAM WHO I TALK TO	
Command Name	ptt
Description	This command will set the Control Units talked to by the scene select buttons of the Control Unit. Parameters must be separated by a space (20h).
Syntax	ptt [Control Unit] [bitmap]<CR>
Allowed Values	Control Unit Control Unit to program bitmap hex bitmap of which Control Units to talk to (bit 0 = Unit 1, bit 7 = Unit 8) Bitmap Examples: 27h = 00100111 = Control Units 6, 3, 2, 1 0Ch = 00001100 = Control Units 4, 3
Example	:ptt 2 C<CR> program Control Unit at address 2 to talk to addresses 3 and 4

PROGRAM LOAD TYPES	
Command Name	plt
Description	This command will program the load types assigned to each zone of the Control Unit. Parameters must be separated by a space (20h).
Syntax	plt [Control Unit] [lt1] [lt2] [lt3] [lt4] [lt5] [lt6] [lt7] [lt8]<CR>
Allowed Values	Control Unit Control Unit to program load types ltx load type for each zone where x is the zone number
Example	:plt 2 1 1 * 1<CR> program zones 1, 2, 4 of address 2 to be incandescent
Additional Information	It is not necessary to send all 8 values, but placement and order is important. Use * for zones that are to remain the same. In the example above, zone 3 does not change, but an * is required as a placeholder to send values for zones 4 and above. See page 4 for load types table.

Load Types Supported by Control Units	GRAFIK Eye 3000 Series	Grafik Integrale™	GRAFIK Eye 4000 Series*
1 = Incandescent, MLV	X	X	X
2 = FDB	X	X	ext
3 = Neon	X	X	ext
4 = Non-dim last ON, first OFF	X	X	X
5 = Non-dim first ON, first OFF	X	X	X
6 = Tu-Wire®	5-5 +		ext
7 = ELV Reverse Phase		X	ext
8 = Auto Phase (REV/FOR)		X	ext
9 = 0-10 Fluorescent		X	ext
10 = DSI Fluorescent		X	ext
11 = DALI Fluorescent		X	ext
12 = PWM Fluorescent		X	ext
13 = Unused			
14 = Unused			
15 = Unused			
16 = AC Shade	7-1 +		7-1 +
17 = Sivoia QED® Shade	7-1 +		7-1 +
* Set Load Type to 1.			
+Key: X = all versions; X-X + = all versions of that code rev or higher; ext = set by external module and circuit selector.			

PRG Commands (continued)

PROGRAM LOW ENDS	
Command Name	ple
Description	This command will program the low-end values assigned to each zone of the Control Unit. Parameters must be separated by a space (20h).
Syntax	ple [Control Unit] [le1] [le2] [le3] [le4] [le5] [le6] [le7] [le8]<CR> Control Unit Control Unit to get low end data from (1 to 8) lex low end hex value for zone x 7Fh = Non-dim (has no low-end setting)
Example	:ple 2 10 10 * 10<CR> program low ends of zones 1, 2, and 4 at address 2 to 10h (16 decimal)
Additional Information	It is not necessary to send all 8 values, but placement and order is important. Use * for zones that are to remain the same. In the example above, zone 3 does not change, but an * is required as a placeholder to send values for zone 4. Other values represent the low-end setting that depends on the load type. (1 = lowest light level possible; numbers greater than 1 represent higher low-end light settings). Each load type has a different maximum low-end value (highest low-end light level). Also, each load type has a default low-end value that is set automatically whenever a load type is changed. The lowest low-end level (least light) for each load type has a value of 1. Each load type has a different max low-end trim value (highest light). There is also a default low end for each type that is set automatically each time a load type is changed. This value is 0.

GRAFIK Eye 3000 Series Control Unit	Low End (LE) Range (higher number = brighter light)	Default Value
Incandescent	1 to 50h	3h or 0
FDB	1 to 50h	39h or 0
Tu-Wire	1 to 50h	6h or 0
Neon/CC	1 to 50h	2Ah or 0
Grafik Integrale™	Low End (LE) Range (higher number = brighter light)	Default Value
Auto	1 to 5Fh	Ah or 0
ELV	1 to 5Fh	Ah or 0
MLV	1 to 5Ah	7h or 0
FDB	1 to 5Ah	38h or 0
0-10	1 to 38h	Ah or 0
DSI	1 to 38h	Ah or 0
DALI	1 to 38h	Ah or 0
PWM	1 to 38h	Ah or 0
Neon/CC	1 to 6Eh	28h or 0
Values for shade and non-dim zones are undefined. Command not available on GRAFIK Eye 4000 series control type units.		

PRG Commands (continued)

PROGRAM HIGH ENDS	
Command Name	phe
Description	This command will program the high-end values assigned to each zone of the Control Unit. Parameters must be separated by a space (20h). This command is valid only on units with <i>GRAFIK Eye</i> software version 7.0 or higher and <i>Integrale</i> .
Syntax	phe [Control Unit] [he1] [he2] [he3] [he4] [he5] [he6] [he7] [he8]<CR> Control Unit Control Unit to get low end data from (1 to 8) hex high end hex value for zone x 7Fh = Non-dim (has no low-end setting)
Example	:phe 2 10 10 * 10<CR> program high ends of zones 1, 2, and 4 at address 2 to 10h (16 decimal)
Additional Information	It is not necessary to send all 8 values, but placement and order is important. Use * for zones that are to remain the same. In the example above, zone 3 does not change, but an * is required as a placeholder to send values for zone 4. Other values represent the high-end setting that depends on the load type. (50h = highest light level possible; numbers less than 50h represent lower high-end light settings). Each load type has a different maximum high-end value (lowest high-end light level). Also, each load type has a default high-end value that is set automatically whenever a load type is changed. The highest high end level (most light) for each load type has a value of 1. Each load type has a different max highend trim value (lowest light). There is also a default high end for each type that is set automatically each time a load type is changed. This value is 0. Note: Values for Window Treatment and Non-Dim Zones are undefined. Command is not available on GRX-4000 series units.

GRAFIK Eye 3000 Series Control Unit	High End (HE) Range (higher number = brighter light)	Default Value
Incandescent	1 to 50h	3h or 0
FDB	1 to 50h	39h or 0
Tu-Wire	1 to 50h	6h or 0
Neon/CC	1 to 50h	2Ah or 0
Grafik Integrale™	High End (HE) Range (higher number = brighter light)	Default Value
Auto	1 to 55h	2Dh or 0
ELV	1 to 55h	1Eh or 0
MLV	1 to 5Ch	9h or 0
FDB	1 to 5Ch	38h or 0
0-10	1 to 38h	Ah or 0
DSI	1 to 38h	Ah or 0
DALI	1 to 38h	Ah or 0
PWM	1 to 38h	Ah or 0
Neon/CC	1 to 55h	45h or 0
Values for shade and non-dim zones are undefined. Command not available on <i>GRAFIK Eye</i> 4000 Series control units.		

PRG Commands (continued)

PROGRAM PRESET SCENE									
Command Name	pps								
Description	This command will program the fade time and preset scene data for each zone of the Control Unit. Parameters must be separated by a space (20h).								
Syntax	pps [Control Unit] [scene] [ft] [Int1] [Int2] [Int3] [Int4] [Int5] [Int6] [Int7] [Int8] <CR>								
Allowed Values	<table> <tr> <td>Control Unit</td> <td>Control Unit to program preset at</td> </tr> <tr> <td>scene</td> <td>scene number 0h (Off) to 10h (Scene 16)</td> </tr> <tr> <td>ft</td> <td>fade time 0h to 3Bh = seconds (0 to 59 seconds) 3Ch to 78h = subtract 3Bh for minutes (1 to 60 minutes)</td> </tr> <tr> <td>Intx</td> <td>intensity for zone x 0h to 7Fh, D0h is unaffected, * is don't change</td> </tr> </table>	Control Unit	Control Unit to program preset at	scene	scene number 0h (Off) to 10h (Scene 16)	ft	fade time 0h to 3Bh = seconds (0 to 59 seconds) 3Ch to 78h = subtract 3Bh for minutes (1 to 60 minutes)	Intx	intensity for zone x 0h to 7Fh, D0h is unaffected, * is don't change
Control Unit	Control Unit to program preset at								
scene	scene number 0h (Off) to 10h (Scene 16)								
ft	fade time 0h to 3Bh = seconds (0 to 59 seconds) 3Ch to 78h = subtract 3Bh for minutes (1 to 60 minutes)								
Intx	intensity for zone x 0h to 7Fh, D0h is unaffected, * is don't change								
Example	<pre>:pps 1 2 5 40 40 * 20 60 60<CR></pre> <p>program scene 2 at address 1 to: 5 second fade don't change Zone 3 25% Zone 4 50% Zones 1, 2 75% Zones 5, 6</p>								

PROGRAM TEMPORARY MODE					
Command Name	ptm				
Description	This command will program the value of the Temporary Mode on a Control Unit. Parameters must be separated by a space (20h).				
Syntax	ptm [Control Unit] [temp mode]<CR>				
Allowed Values	<table> <tr> <td>Control Unit</td> <td>Control Unit to program temporary mode</td> </tr> <tr> <td>temp mode</td> <td>see below</td> </tr> </table>	Control Unit	Control Unit to program temporary mode	temp mode	see below
Control Unit	Control Unit to program temporary mode				
temp mode	see below				

Temporary Mode

Temporary mode determines whether temporary light level changes are normally saved. See *GRAFIK Eye Installation Guide* for more details.

- 0 = Sd - Save by default. Any changes to the intensities or fade time at the Control Unit are saved automatically. TEMPORARY LED is normally OFF, but can be manually overridden to ON.
- 1 = Sb - Save by button. Any changes to the intensities or fade time will not normally be saved. TEMPORARY LED is normally ON, but can be manually overridden to OFF.
- 2 = Sn - Save never. All changes to the intensities are temporary. TEMPORARY LED is always ON and cannot be overridden.
- 3 = 4S - Scene selects and master raise/lower only. All buttons on the Control Unit are disabled, except the scene select buttons and the master raise/lower buttons.
- 4 = bd - Buttons disabled. All buttons on the Control Unit are disabled. IR and Accessory Control commands will not be disabled.

Programming Mode: Accessory Control Commands

All Programming Mode Commands require that the GRX-PRG or GRX-CI-PRG Interface be in programming mode. To start programming mode, see the START PROGRAMMING MODE (spm) command.

READ ACCESSORY CONTROL INFO	
Command Name	rru
Description	This command will return the type of Accessory Control, code revision level, function, and other information about the Accessory Control. Parameters must be separated by a space (20h).
Syntax	rru [Acc Control]<CR>
Allowed Values	Acc Control 1h to Fh (1 to 15)
Example	:rru A<CR> get details of Accessory Control at address 10
Response	<pre>~:ru [Acc Control] [type] [code_rev] [...other Acc Control data...] Acc Control address for which details are returned type see chart below code_rev revision level 00h to 7Fh other data see below ~:ru A 0 20 3 2 Accessory Control at address 10 is an NTGRX-4S with code revision level 2-0, programmed to "talk to" Control Units 1 and 2 and select scenes 5 to 8</pre>
Additional Information	The Accessory Control data returned will be different for each Accessory Control, depending on its type. Refer to the following table.

READ ACCESSORY CONTROL RESPONSE TABLE

Type	Type Description	Other Accessory Control Data
0	4S	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) setting of DIP switches 5 and 6 (3 = scenes 1 to 4) (2 = scenes 5 to 8) (1 = scenes 9 to 12) (0 = scenes 13 to 16)
1	4Q	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) Bitmap of DIP switches 5 and 6 (3, 2 = seq 1 to 4) (1, 0 = seq 5 to 16)
2	4PS	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
3	4M	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
		e) Bitmap Control Units button 5 (bit 0 = addr 1)
		f) setting of DIP switches 5 and 6 (3, 2 = button 5 turns ON) (1, 0 = button 5 turns OFF)
5	CIR	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) variable IR address value
		c) setting of DIP switches 5 and 6 starting scene of unit (3 = scene 1) (2 = scene 5) (1 = scene 9) (0 = scene 13)
7	4S IR	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) variable IR address value
		c) setting of DIP switches 5 and 6 starting scene of unit (3 = scene 1) (2 = scene 5) (1 = scene 9) (0 = scene 13)
8	FINETUNE	a) Control Unit number (1 to 8)
		b) Bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
9	2B Scene	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) setting of DIP switches 5 and 6 (3 = scenes 9 to 10) (2 = scenes 13 to 14)
A	2B Panic	a) Bitmap Control Units talked to (bit 0 = addr 1)
B	2B Part	a) Bitmap Control Units talked to (bit 0 = addr 1)
C	2B 4Q	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) setting of DIP switch 7 (1 = sequence scenes 5 to 16) (0 = zone lockout)

READ ACCESSORY CONTROL RESPONSE TABLE (CONTINUED)

Type	Type Description	Other Accessory Control Data
D	2B 1S	a) Bitmap Control Units talked to (bit 0 = addr 1)
F	DACPI	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) photocell calibration value high byte
		c) photocell calibration value low byte
20	A/V or I/O 4S Maintained Output	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) setting of DIP switches 5 and 6 (3 = scenes 1 to 4) (2 = scenes 5 to 8) (1 = scenes 9 to 12) (0 = scenes 13 to 16)
		c) Bitmap of current states of inputs 1 to 5 (bit 0 = input 1, set (1) = closed)
21	A/V or I/O 4Q	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) setting of DIP switches 5 and 6 (bit 1 on = momentary inputs) (bit 1 off = maintained inputs) (bit 2 on = seq 1 to 4) (bit 2 off = seq 5 to 16)
		c) Bitmap of current states of inputs 1 to 5 (bit 0 = input 1, set (1) = closed)
22	A/V or I/O 4PS	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
		e) Bitmap Control Units button 5 (bit 0 = addr 1)
		f) setting of DIP switches 5 and 6 (3 = momentary inputs) (2 = maintained inputs)
		g) Bitmap of current states of inputs 1 to 5 (bit 0 = input 1, set(1) = closed)
24	A/V or I/O OCC	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
		e) Bitmap Control Units button 5 (bit 0 = addr 1)
		f) setting of DIP switch 5 (0 = 0 off scene only) (1 = 1 on and off function)
		g) Bitmap of current states of inputs 1 to 5 (bit 0 = input 1, set(1) = closed)
25	A/V or I/O 4S Momentary Output	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) setting of DIP switches 5 and 6 (3 = scenes 1 to 4) (2 = scenes 5 to 8) (1 = scenes 9 to 12) (0 = scenes 13 to 16)
		c) Bitmap of current states of inputs 1 to 5 (bit 0 = input 1, set (1) = closed)

READ ACCESSORY CONTROL RESPONSE TABLE (CONTINUED)

Type	Type Description	Other Accessory Control Data
28	RS232 Fixed Address	a) Bitmap of DIP switches
42	Shade Control 3W or 3WRL	a) Control Unit Number 1 to 8
		b) Bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
43	Shade Control 2W	a) Control Unit Number 1 to 8
		b) Bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
60	CCO in Scene Control	a) Bitmap of Control Units I listen to
		b) Bitmap of Switch Settings bits 0 to 2 indicate scene selections bit 3 indicates scene match status bit 4 indicates momentary or maintained outputs 0 ½ ON; 1 ½ OFF Refer to GRX-CCO installer's guide for more information.
61	Shade Control 3WD	Top half of control
		a) Control Unit Number 1 to 8
		b) bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
		Bottom half of control Read with :rrs command format rrs [Acc Control] [bank to read]
Response: rrs [Acc Control] [type][code rev][data packet] data packet		a) Control Unit Number 1 to 8 b) bitmap of zones on unit above that I talk to c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
70	Group Controller	a) Control Unit for channel 1
		b) bitmap of zones that I listen to
		c) 3 more Control Units and zone bitmaps can follow
71	CCO in Zone Control	a) Control Unit for channel 1
		b) bitmap of zones that I listen to
		c) Up to 7 more Control Units and zone bitmaps can follow
72	Sivoia QED® Interface	a) Control Unit Number 1 to 8
		b) bitmap of zones that I listen to
80	Preset Shade Control 5WRL	a) Control Unit Number 1 to 8
		b) Bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
31 to 36, 41, 51, 52, 62	Custom Shade Control	a) Control Unit Number 1 to 8
		b) Bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .

PRG Commands (continued)

READ ACCESSORY CONTROL SPECIFIC DATA	
Command Name	rrs
Description	This command is used to get data from the Accessory Control that is not contained in the rru response. Parameters must be separated by a space (20h).
Syntax	rrs [Acc Control] [packet]<CR>
Allowed Values	Acc Control 1h to Fh (1 to 15)
Examples	
DACPI	:rrs A 1<CR> get details of Accessory Control at address 1
CCO in Zone Control	:rrs 11 1<CR> get details of Accessory Control at address 1
3WD	:rrs 1 1<CR> get details of Accessory Control at address 1
Responses	
DACPI	<pre>~:rs [Acc Control] [packet] [(...Acc Control specific packet data...)] packet 1 specific data a) Threshold 1 (0h to 63h) (1 to 99) b) Threshold 1 (0h to 63h) (1 to 99) c) Threshold 1 (0h to 63h) (1 to 99) d) Enforce Option 0h = Not Enforced 1h – 7Fh = Enforced ~:rs A 1 19 32 4B Thresholds for Bank 1 of DACPI Accessory Control at address 10: 25% : Threshold 1 50% : Threshold 2 75% : Threshold 3</pre>
CCO in Zone Control	<pre>~:rs [Acc Control] [packet] [(...Acc Control specific packet data...)] specific data Bitmap of OPTIONS switch settings Switches 1 to 5 correspond to bits 0 to 4, respectively. 0 = ON, 1 = OFF ~:rs 1 1 1 the OPTIONS switch is set as follows: Switch 1 : ON Switch 2 : ON Switch 3 : ON Switch 4 : ON Switch 5 : OFF</pre>
3WD	<pre>~:rs [Acc Control] [type] [code rev] [packet] [(...Acc Control specific packet data...)] type 61 (accessory control type) code rev (software version) packet 0 = top; 1 = bottom specific data a) control unit b) bitmap of zones I talk to c) ...up to 7 more control units and bitmaps can follow... ~:rs 1 1 7 3 8 1 the 3WD talks to zones 1 and 2 on Control Unit 7 and zone 1 on Control Unit 8</pre>
Additional Information	The Accessory Control data returned will be different for each Accessory Control, depending on its type.

PRG Commands (continued)

PROGRAM ACCESSORY CONTROL	
Command Name	pru
Description	This command will program the Accessory Control. The data format will be different, depending on the type of Accessory Control. Parameters must be separated by a space (20h).
Syntax	pru [Acc Control] [type] [specific data]<CR>
Allowed Values	Acc Control 1h to Fh (1 to 15): address of Accessory Control type see chart below specific data see chart below
Example	:pru A 0 3 program NTGRX-4S Accessory Control at address 10 to “talk to” Control Units at address 1 and 2
Additional Information	The Accessory Control data sent will be different for each Accessory Control, depending on its type. Refer to the following table.

PROGRAM ACCESSORY CONTROL DATA TABLE

Type	Type Description	Other Accessory Control Data
0	4S	a) Bitmap Control Units talked to (bit 0 = addr 1)
1	4Q	a) Bitmap Control Units talked to (bit 0 = addr 1)
2	4PS	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
3	4M	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
		e) Bitmap Control Units button 5 (bit 0 = addr 1)
5	CIR	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) variable IR address value
7	4S IR	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) variable IR address value
8	FINETUNE	a) Control Unit number (1 to 8)
		b) Bitmap of zones on unit above that i talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
9	2B Scene	a) Bitmap Control Units talked to (bit 0 = addr 1)
A	2B Panic	a) Bitmap Control Units talked to (bit 0 = addr 1)
B	2B Part	a) Bitmap Control Units talked to (bit 0 = addr 1)
C	2B 4Q	a) Bitmap Control Units talked to (bit 0 = addr 1)
D	2B 1S	a) Bitmap Control Units talked to (bit 0 = addr 1)
F	DACPI	a) Bitmap Control Units talked to (bit 0 = addr 1)
		b) photocell calibration value high byte
		c) photocell calibration value low byte

PROGRAM ACCESSORY CONTROL DATA TABLE (CONTINUED)

Type	Type Description	Other Accessory Control Data
20	A/V or I/O 4S Maintained Output	a) Bitmap Control Units talked to (bit 0 = addr 1)
21	A/V or I/O 4Q	a) Bitmap Control Units talked to (bit 0 = addr 1)
22	A/V or I/O 4PS	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
24	A/V or I/O OCC	a) Bitmap Control Units button 1 (bit 0 = addr 1)
		b) Bitmap Control Units button 2 (bit 0 = addr 1)
		c) Bitmap Control Units button 3 (bit 0 = addr 1)
		d) Bitmap Control Units button 4 (bit 0 = addr 1)
		e) Bitmap Control Units button 5 (bit 0 = addr 1)
25	A/V or I/O 4S Momentary Output	a) Bitmap Control Units talked to (bit 0 = addr 1)
42	Shade Control 3W or 3WJ	a) Control Unit Number 1 to 8
		b) Bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow. . .
43	Shade Control 2W	a) Control Unit Number 1 to 8
		b) Bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow. . .
60	CCO in Scene Mode	a) bitmap of Control Units I listen to
61	Shade Control 3WD	Top half of control a) Control Unit Number 1 to 8 b) Bitmap of zones on unit above that I talk to c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
		Bottom half of control Read with :rrs command format rrs [Acc Control] [bank to read] Response rrs [Acc Control] [type][code rev][data packet] data packet a) Control Unit Number 1 to 8 b) Bitmap of zones on unit above that I talk to c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
70	Group Controller	a) Control Unit for channel 1
		b) bitmap of zones for channel 1 Only one bit may be set except: 0 indicates no Control Unit Controls Channel, 55h will leave programming unaffected
		c) Repeat for Channels 2 to 4
71	CCO in Zone Control	a) Control Unit for channel 1
		b) Bitmap of zones for channel Only one bit may be set except; 0 indicates no Control Unit controls Channel, 55h will leave programming unaffected
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
72	Sivoia QED® Interface	a) Control Unit
		b) bitmap of zones listened to. Bitmap must have only 1 bit set

PROGRAM ACCESSORY CONTROL DATA TABLE (CONTINUED)

Type	Type Description	Other Accessory Control Data
80	Preset Shade Control 5WRL	a) Control Unit Number 1 to 8
		b) bitmap of zones on unit above that I talk to
		c) . . . up to 7 more Control Units and zone bitmaps can follow . . .
	Custom Shade Control	

PRG Commands (continued)

PROGRAM ACCESSORY CONTROL SPECIFIC DATA	
Command Name	prs
Description	This command is used to program Accessory Controls with data values that are not contained in the pru command. Parameters must be separated by a space (20h). The command will have a format that is dependent on the type of Accessory Control.
Syntax	prs [Acc Control] [packet] [type] [specific data]
Allowed Values	<p>Acc Control 1h to Fh (1 to 15): address of Accessory Control</p> <p>DACPI packet: 1 to 4 (Bank #) specific data: a) Threshold 1 (0h to 63h) (1 to 99) b) Threshold 2 (0h to 63h) (1 to 99) c) Threshold 3 (0h to 63h) (1 to 99) d) Enforce Option: 0h = Not Enforced; 1h to 7Fh = Enforced</p> <p>3WD packet: 0 = top; 1 = bottom type: 61 specific data a) Control Unit b) bitmap of zones that I talk to c) ...up to 7 more Control Units and zone bitmaps can follow . . .</p>

PRG Commands (continued)

Non-Programming Mode Command

SET REMOTE LEDS	
Command Name	srl
Description	This command will turn on the given LEDs in the Accessory Control. The LEDs will override the normal LED functionality of the control. Parameters must be separated by a space (20h). On GRX-AV or GRX-IO, the output will be set.
Syntax	srl [Acc Control] [bitmap]<CR>
Allowed Values	Acc Control 1h to Fh (1 to 15): address of Accessory Control bitmap hex bitmap 0h to 7Fh (lsb = LED 1 of control) bitmap value of FFh will result in the Accessory Control reverting back to its normal LED functionality (7 LEDs maximum per Accessory Control) Bitmap Examples: 7h = 00000111 = turn on LEDs 3, 2, 1 and turn off LEDs 7, 6, 5, 4 1Ch = 00011100 = turn on LEDs 5, 4, 3 and turn off LEDs 7, 6, 2, 1
Example	:srl 2 8 turn on LED 4 of Accessory Control at address 2 turn off LEDs 1, 2, 3, 5, 6, 7
Additional Information	Prior to receiving any srl command, Accessory Control LEDs will reflect the status defined by DIP switch settings. Any srl command will override the status LEDs. An srl command with a bitmap value of FFh will cause the Accessory Control's LEDs to revert back to reflecting the status defined by the DIP switch settings.

DACPI Accessory Control Commands

DACPI ON	
Command Name	P+
Description	This command will turn ON the DACPI photocell control at the address specified. The control will become active and transmit scene selections based upon its programmed thresholds and the available natural lighting (normal DACPI function).
Syntax	:P+[Acc Control] Turns on specified DACPI
Allowed Values	1h to Fh (1 to 15) address of DACPI Accessory Control
Example	:P+A<CR> turn on DACPI Accessory Control at address 10

DACPI OFF	
Command Name	P-
Description	This command will turn OFF the DACPI photocell control at the address specified. Only the Bank switch and the four Manual Scene Select Switches will be active. No automatic Scene Selections will occur. Manually selected Scenes will be within the currently active Bank.
Syntax	:P-[Acc Control] Turns off specified DACPI
Allowed Values	1h to Fh (1 to 15) address of DACPI Accessory Control
Example	:P-B<CR> turn off DACPI Accessory Control at address 11

Appendix A

ASCII Character Lookup Chart

ASCII	Hex Value	Decimal Value	ASCII	Hex Value	Decimal Value
:	3A	58	S	53	83
space	20	32	T	54	84
+	2B	43	U	55	85
-	2D	45	V	56	86
~	7E	126	W	57	87
<CR>	0D	13	X	58	88
<lf>	0A	10	Y	59	89
0	30	48	Z	5A	90
1	31	49	a	61	97
2	32	50	b	62	98
3	33	51	c	63	99
4	34	52	d	64	100
5	35	53	e	65	101
6	36	54	f	66	102
7	37	55	g	67	103
8	38	56	h	68	104
9	39	57	i	69	105
A	41	65	j	6A	106
B	42	66	k	6B	107
C	43	67	l	6C	108
D	44	68	m	6D	109
E	45	69	n	6E	110
F	46	70	o	6F	111
G	47	71	p	70	112
H	48	72	q	71	113
I	49	73	r	72	114
J	4A	74	s	73	115
K	4B	75	t	74	116
L	4C	76	u	75	117
M	4D	77	v	76	118
N	4E	78	w	77	119
O	4F	79	x	78	120
P	50	80	y	79	121
Q	51	81	z	7A	122
R	52	82	~	7E	122

Error Codes

Error Description

1	Control Unit Raise/Lower error
2	Invalid scene selected
6	Bad command was sent
13	Not a timeclock unit (GRX-ATC or GRX-PRG)
14	Illegal time was entered
15	Invalid schedule
16	No Super Sequence has been loaded
20	Command was missing Control Units
21	Command was missing data
22	Error in command argument (improper hex value)
24	Invalid Control Unit
25	Invalid value, outside range of acceptable values
26	Invalid Accessory Control
31	Network address illegally formatted; 4 octets required (xxx.xxx.xxx.xxx)
80	Time-out error, no response received
100	Invalid Telnet login number
101	Invalid Telnet login
102	Telnet login name exceeds 8 characters
103	Invalid number of arguments
255	GRX-PRG must be in programming mode for specific commands

Appendix A (continued)

Control Unit and Accessory Raw Feedback

Setting DIP switch 6 of any RS232 Interface in the ON position will report when a button has been pushed or released on a GRAFIK Eye Control Unit or Accessory Control. The response will be formatted as follows:

[address][button data]

address - address of Control Unit or Accessory Control where button was pressed or released

button data - what action was taken as a result of the button press or release

The first parameter is the address of the Control Unit or Accessory Control where a button was pushed or released. A capital letter indicates a button was pushed, and a lowercase letter indicates a button was released. The table that follows is a list of how addresses will be reported by raw feedback.

Unit Type:	Addressed as:	Address reported:	Unit Type:	Addressed as:	Address reported:
Control Unit	A1	A or a	Accessory Control	5	M or m
	A2	B or b		6	N or n
	A3	C or c		7	O or o
	A4	D or d		8	P or p
	A5	E or e		9	Q or q
	A6	F or f		10	R or r
	A7	G or g		11	S or s
	A8	H or h		12	T or t
Accessory Control	1	I or i	13	U or u	
	2	J or j	14	V or v	
	3	K or k	15	W or w	
	4	L or l	16	X or x	

The second parameter, **button data**, varies based on the function of the Control Unit or Accessory Control. Functions can be separated into four major categories: scene selection/fine tuning, Special Functions (4Q), partitioning, and mastering.

Scene Selection/Fine Tuning (GRX-3100, 3500, 4100, and 4500, NTGRX-4S, 4S-IR, and 2B-SL, GRX-4S-DW, & GRX-CIR)

button data represents the scene that was selected by the pressed or released button. Characters 1 to 9 represent scenes 1 to 9; characters 10 to 16 represent scenes 10 to 16, and 0 represents the OFF scene. For a Control Unit, a Master Raise is indicated by a 17, while a Master Lower is indicated by an 18. For a fine tuning control, such as NTGRX-2B-SL, a 1 indicates that the Raise or top button has been pushed, and a 0 indicates that the Lower or bottom button has been pushed.

Example of raw feedback:

D3	button press selecting scene 3 on GRAFIK Eye Control Unit addressed as A4
d3	button release after selecting scene 3 on GRAFIK Eye Control Unit addressed as A4

Special Functions (NTGRX-4Q, GRX-AV, GRX-IO)

The second parameter will be a value representing which functions are active. If the address parameter is a lowercase letter, no functions are active. The functions available and their values are: Sequence = 1, Zone Lock = 2, Scene Lock = 4, Fade Override (NTGRX-4Q) = 8, Panic (GRX-AV) = 16. Values are added if more than one function is active.

Example of raw feedback:

J6	zone lock and scene lock are active on the Accessory Control addressed as 2
j1	no functions are active on the Accessory Control addressed as 2

Partitioning and Mastering (NTGRX-4M, NTGRX-4PS, GRX-AV, GRX-IO)

The status of these functions cannot be decoded by the RS232 Interface.

Binary to Hexadecimal Conversion Chart

Binary	Hex
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

Note:

To make larger numbers, combine the binary groups.

Example:

6F = 01101111

-

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