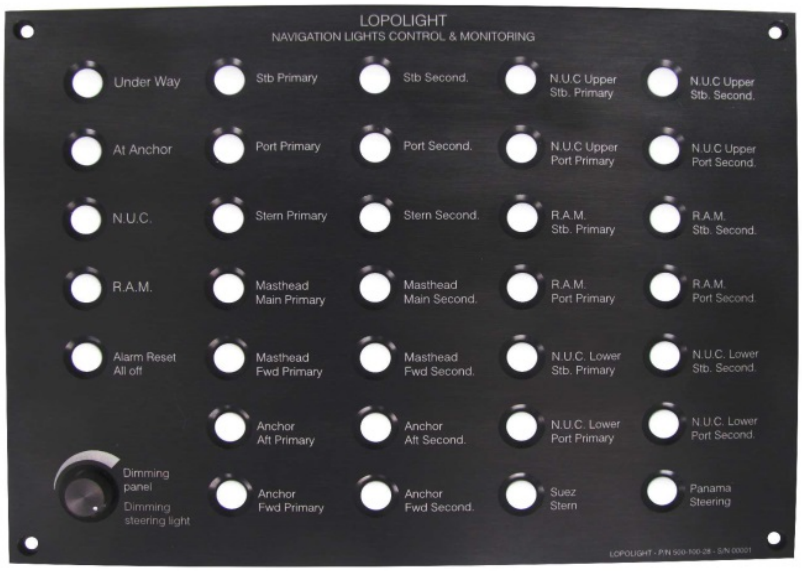
Lopolight navigation light control panel
External monitoring and control

Rev. 2.0
Jan 2017

Protocol
NMEA 0183 interface
EN-61162-1 @ IEC:2010(E)



Contents:

1.0 Physical interface: (connectors accessible on rear of panel).

The physical interface is based on RS-232, 4800 Baud,N,8,1 - NON-isolated
Connector: “Secondary COM” SUBD-09, female. Pin 8=TX, Pin 7=RX, Pin 5=GND
Max cable length external equipment to panel: ~10 meter

NOTES:

1) Non-standard pin-layout of both SUBD-09

2) Software version and panel revision number can be found behind rear aluminium cover – remove 7 pcs. M3 screws for access.

3) Panel rev: Must be rev.4 if using “secondary com” for NMEA comm.
(If panel rev < 4: Use main com pins – see image 2).

4) Panel CPU software must be 1.20 or greater. Software version is marked on either side of the PCB. (Here VER: 1.35).

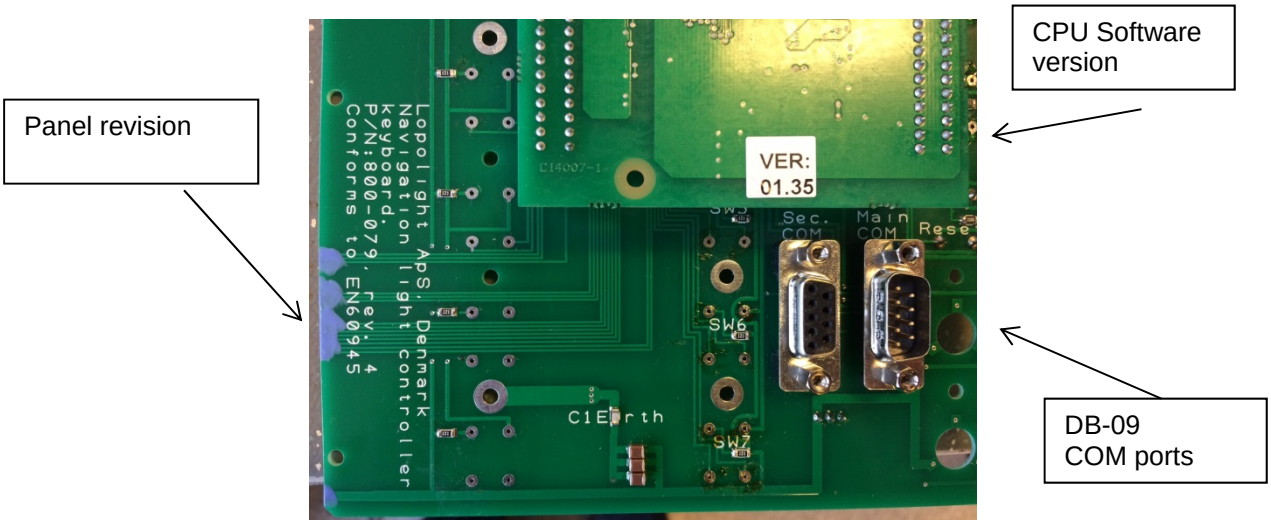


Image 1

Connections: [rev4]
(see next page for complete panel schematic)

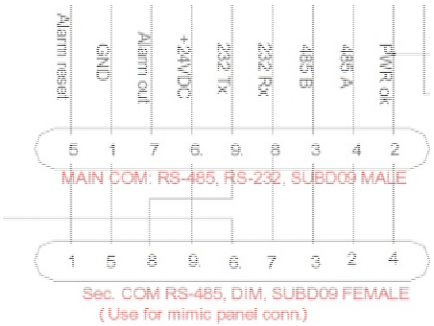
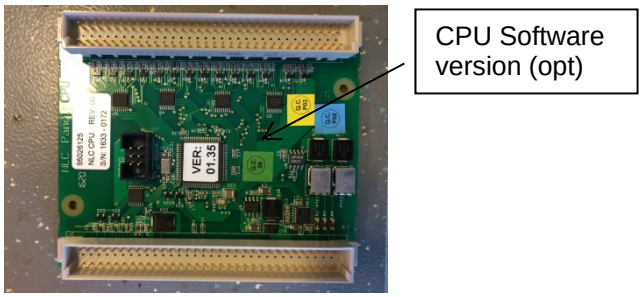


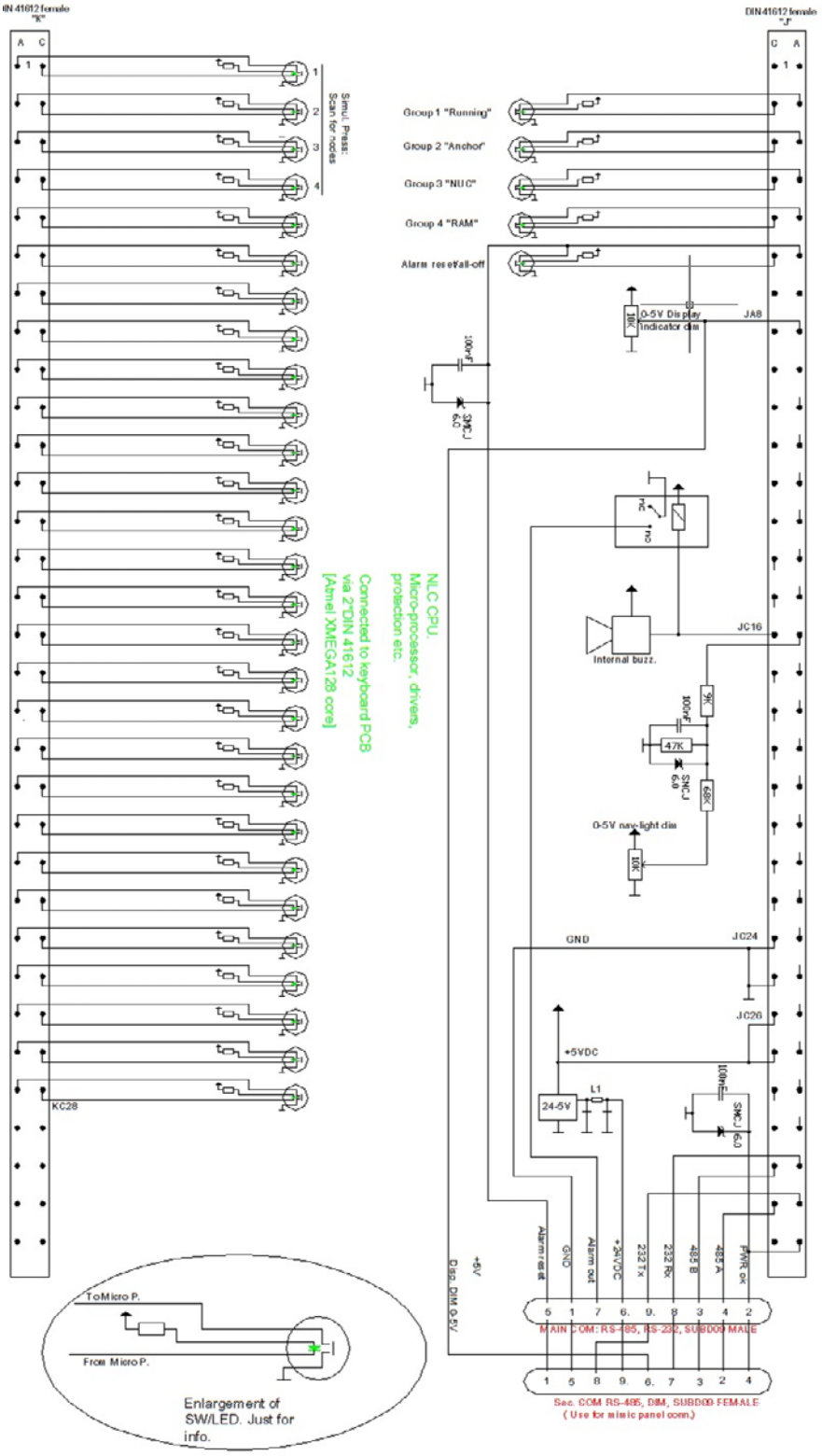
Image 2



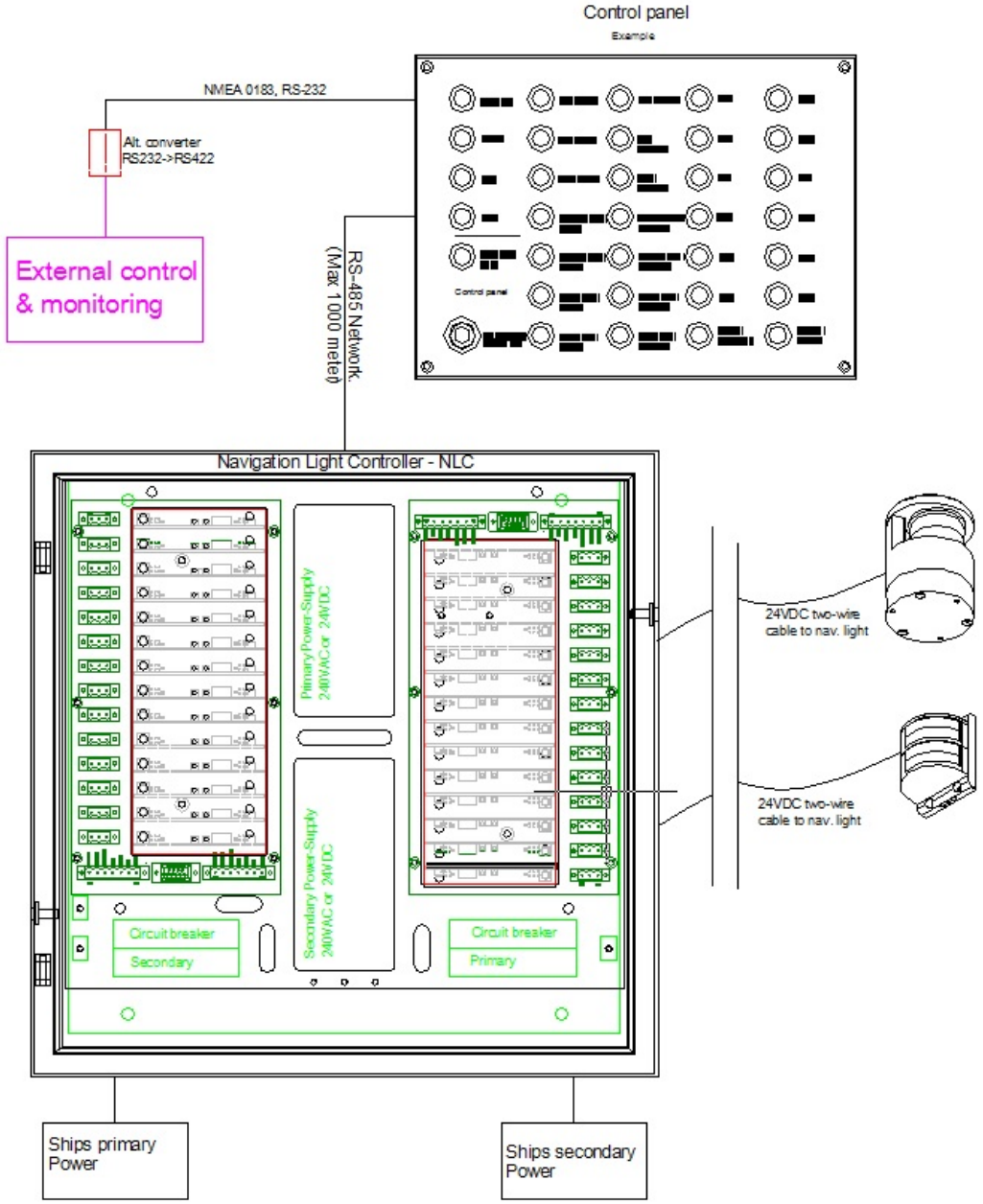
1.1 Optional physical interface

The RS-232 can be converted to isolated RS-422 using lopolight P/N: 600-977 (ICP Con 7520A-CR, 4 wire isolated), if so desired
Max cable length, equipment to panel: ~500 meter

1.2 Wiring schematic, Panel (rev. 4)



1.3 System overview

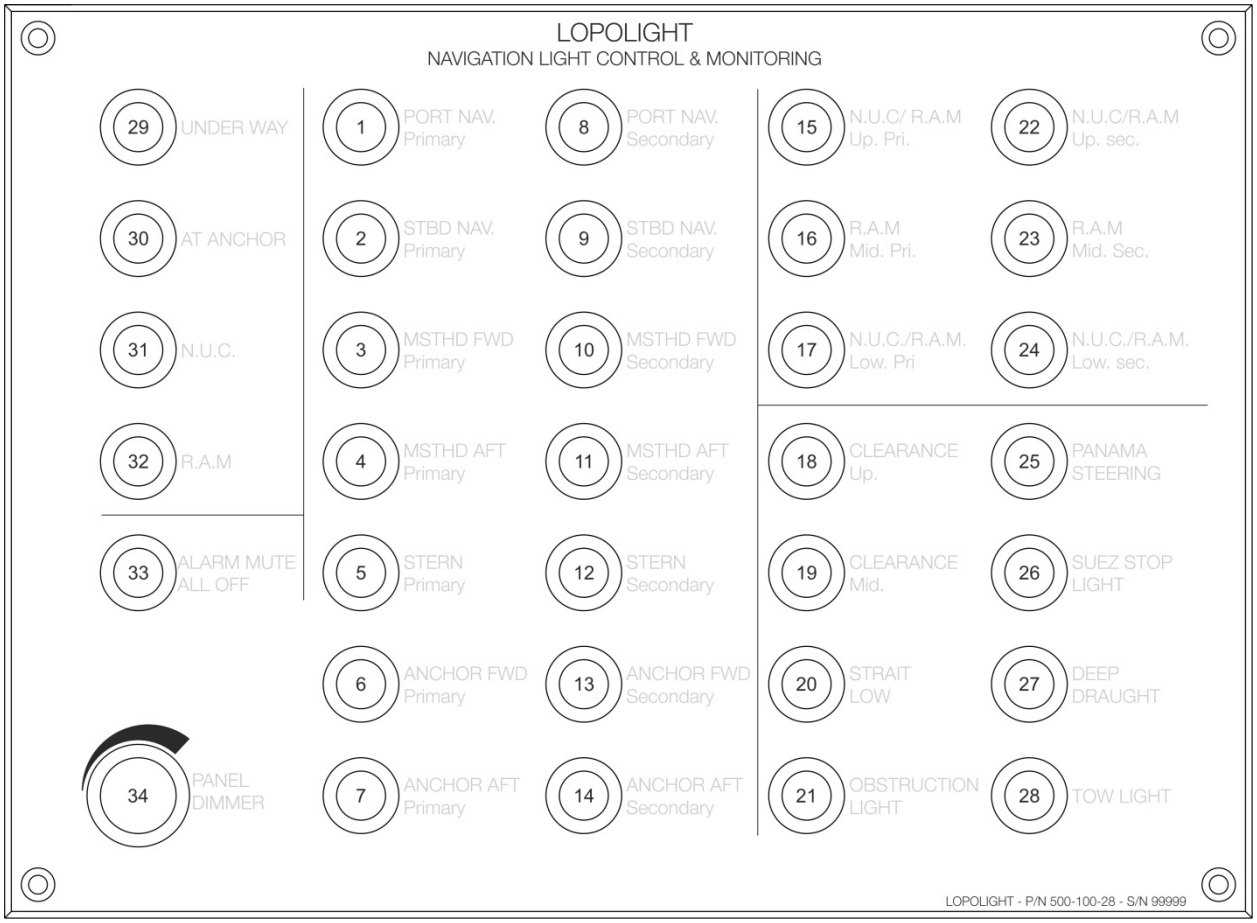


2.0 Control and monitoring - principle:

Each button has a fixed logical address assigned. Note that the four group buttons to the left are assigned to address 29,30,31 & 32.

The status and command telegrams refer to the addresses as positions in the telegram, regardless of text and function. If a group button is addressed with a command telegram, then the individual buttons on the panel, assigned when panel set-up is performed, will be activated.

Mechanical variations:
The example below show a full 28-button keyboard. The 21 and 14 button versions use the same numbering system – up to address 14 & 21.
Panels may be supplied in rotated versions – the dimming potentiometer (pos. 34) can be used as a mechanical reference.



3.0 Data protocol: "Simple comma delimited NMEA 0183 sentences"
Data protocols and datafields are defined as described in IEC-61162, (NMEA 0183) (EN-61162-1 @ IEC:2010(E)), including using proprietary sentences.
Panel functions as described by MSC 253

3.1 Checksum: Checksum calculation as described in EN-61162-1
Important note: The two checksum characters may be replaced by two space characters (Ascii) -for test purposes- *in command and query telegrams only*.

3.2 Status telegram: Status or alarm telegram is sent every second.

Length: Proprietary detailed status telegram consists of talker ID – 37 commas-checksum delimiter-checksum-checksum - <crlf>
Ascii characters or null-characters between the commas, stating status of equipment and individual lights (nodes).
The "node" (after comma no.6) refer to the individual button id´s. refer to 2.0 page 6. See description of datafields below.

Talker	type S (orK)	Panel 1 (or2)	ID	comm.	PWR	node1	node2	node3	node4	node5	node..	node27	node28	node29	node30	node31	node32	*	Chk	Chk	CrLf
$PLPL	S	1	NL	B	B	:	:	6	3	W	0	<null>	D	:	:	:	G	*	x	x	<crlf>
Lopolight Proprietær	Status telegram	Panel (1 or 2) default: 1	Navigation Light control	Comm status: B=ok, C= fault	Pwr. status B=ok, C= fault	node 01 ON	Node02 ON	Node03 dimmed to 6	Node04 dimmed to 3	Node05 Err	node 06-26 off	Node27 not present	Node28 on + de-ice	Node29 ON	Node30 ON	Node31 ON	Group32 ON	Cheksum delimiter	Xor MSB	Xor LSB	End

The example above will look like the following:

$PLPL,S,1,NL,B,B,:,:,6,3,W,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,,D,:,:,:,G*xx<crlf>

Meaning: 1-2 =on, 3= dimmed to 6, 4= dimmed to 3, 5= fault, 6-26= off, 27= not present, 28= heat on, node 29 -31 on, group 32 on.

Note:
(node 28: Heat on: De-ice model with heater active (ice class lights only)
(node 3 & 4: Dimmed: Navy lights only)

3.3 Node status values:

[Ascii] "0" to "**:**" (normally "**:**" is used for ON). W=failure, D=on & heater on, G=Group on.

3.4 Alarm telegram: Sent after status telegram - in case of "W" in status telegram.
The Alarm telegram according to IEC-61162 (not Lopolight proprietary).

Talker	node	Al. Cond	buzzer	Text	delimiter	XorMSB	XorLSB
$NLALR	118	A	V	NL118-FAULT	*	X	X
Navigation light alarm	node 18, panel 1	Node alarm condition	Buzzer condition	node 18 fault (panel 1) "anyText"		checksum	checksum

The example above will look like the following:

$NLALR,118,A,V,NL118-FAULT*xx<crlf>

Meaning: Fault detected on panel 1, node 18, buzzer silenced

Buzzer cond: A=buzzer active, V=buzzer silenced
Alarm cond: A= alarm present, V=no alarm
Note: Node denomination logic.

Further alarm telegram examples:

Example2:	Node 2 fault & buzzer active:		$NLALR,102,A,A,NL102-fault*xx<crlf>
Example 3:	Alarm no more present:		$NLALR,102,V,V,NL102-fault*xx<crlf>

3.4 alarm telegram examples – continued:

ALR - Alarm telegram ex2 (pwr)	Sent as every second telegram only if fault is detected. Fault details can be found in preceeding status telegrar							
	Talker	node	Al. Cond	buzzer	Text	delimiter	XorMSB	XorLSB
	$NLALR	1P (or 1C)	A	V	NLPWR-fault	*	X	X
	Navigation light alarm	power fail, panel 1	Node alarm condition	Buzzer condition	power fault (panel 1) "anytext"		checksum	checksum
Example4:	Power fault & buzzer active:			$NLALR,1P,A,A,NLPWR-fault*xx<crlf>				
"node" field:								
P:	Power							
C:	Communication							
number:	node							

4.0 Command telegram: Acknowledge alarm = silence buzzer.

ACK - Silence buzz. tel.	The following telegram shall silence the buzzer, but keep alarm-state on the individual lamp.							
	Talker	ID	delimiter	XorMSB	XorLSB			
	$aaACK	id	*	X	X			
	Any talker	alarm ID		checksum	checksum			
aa is talker id. The talker ID is disregarded by the NLC,								
id is alarm number ID. The ID is disregarded by the NLC								
example that will silence buzzer:			$aaACK,id*xx<crlf>					

4.1 Command telegram: Query for dimming state.

Q -Query telegram:	Relevant dimming information shall be returned upon reception of a query telegram.						
Exampel:	Talker	Listener	Query	Display dim	delimiter	XorMSB	XorLSB
	$aa	NL	Q	DDC	*	X	X
	Any talker	nav light controller	Query command	Display Dimming Control		checksum	checksum
example:	$--NLQ,DDC*xx<crlf>						

4.2 Status telegram: Panel dimming state

Answer to dimming query:									
	Talker	DIM	(preset)	Dim level	Color palette	Sentence	delimiter	XorMSB	XorLSB
	$NL	DDC	a	xx	a	R	*	X	X
	Any talker	Dim query reply	Ignore this	00 to 99% (0-1(steps)	Ignore this	Reply. Always R		checksum	checksum
example, 40%:	$NLDDC,,40,,R*xx<crlf>								

4.3 Command telegram: Set dimming level on panel

DDC Dimming command:	(Overrules pot-meter setting, until next time pot-meter is activated by operator)								
	Talker	DIM	(preset)	Dim level	Color palette	Sentence	delimiter	XorMSB	XorLSB
	$aa	DDC	a	xx	a	C	*	X	X
	Any talker	Dim setting (always DDC)	Ignore this	00 to 99% (0-10 steps)	Ignore this	Command. Always C		checksum	checksum
example, 55%:	$--DDC,,55,,C*xx<crlf>		(Set dim level to level 6) [55 round up to 6]						

4.3 Command telegram: Control nodes and/or groups

(if this example is sent to panel, it will result in status telegram as shown in section 3.2).

Telegram length:
Proprietary detailed command telegram consist of: talker ID – EXACTLY 37 commas [with relevant values or null-char between – checksum delimiter – checksum - checksum - <crlf>

Note: *Space characters may be used instead of checksum*

Ascii characters or null-characters between the commas, setting desired state for individual lights (nodes).
The “node” (after comma no.6) refers to the individual button id´s as shown in section 2.0 page 6.
See description of data fields below.

Receiver	type K	Panel 1 (o	ID	comm.	PWR	node1	node2	node3	node4	node5		node..	node27	node28	node29	node30	node31	node32	*	Chk	Chk	CrLf
$PLPL	K	1	NL	Y	Y	:	:	6	3	0		0	<null>	D	:	:	:	G	*	x	x	<crlf>
Prop. ID [anytxt after $ may be disregarded]	K= Command telegram	Panel (1 or 2) Normally: 1	Navigation Light control (always NL)	disregarded (anychar)	disregarded (anychar)	node 01 ON	Node02 ON	Node03 dimmed to 6	Node04 dimmed to 3	Node05 off		node 06- 26 off	Node27 not present	Node28 on + deice	Node29 ON	Node30 ON	Node31 ON	Group32 ON	Cheksum delimiter	Xor MSB	Xor LSB	End

The example above will look like the following:

$PLPL,K,1,NL,Y,Y,:,:,6,3,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,,D,:,:,:,G*xx<crlf>

Meaning: 1-2 =on, 3= dimmed to 6, 4= dimmed to 3, 5-26= off, 27= not present, 28= heat on, node 29 -31 on, group 32 on.

(node 28= Heat on: De-ice model with heater active (ice class lights only)
(node 3 & 4=dimmed: Navy lights only)
(“Y”,”Y” in example: “anychar”)
