

Lopolight Smart Controller

Part of the Lopolight NLC RS-485 system

Manual, rev.1 09 Feb. 2015



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1 Preface

The Lopolight Smart Controller is a compact microprocessor based unit, compatible with all other Lopolight RS-485 enabled products. It has two basic functions:

- 1) to “listen in” on an already existing RS-485 network, typically used between a navigation light control panel and a NLC.
- 2) to be used as interface between a number of customer specified pushbuttons and NLC/NPC based products.

The unit basically holds a number of TTL level -in and –outputs, one RS-485 based serial port. The microprocessor organizes and translates data from RS-485 to TTL and vice versa.

1.2 Basic working principle

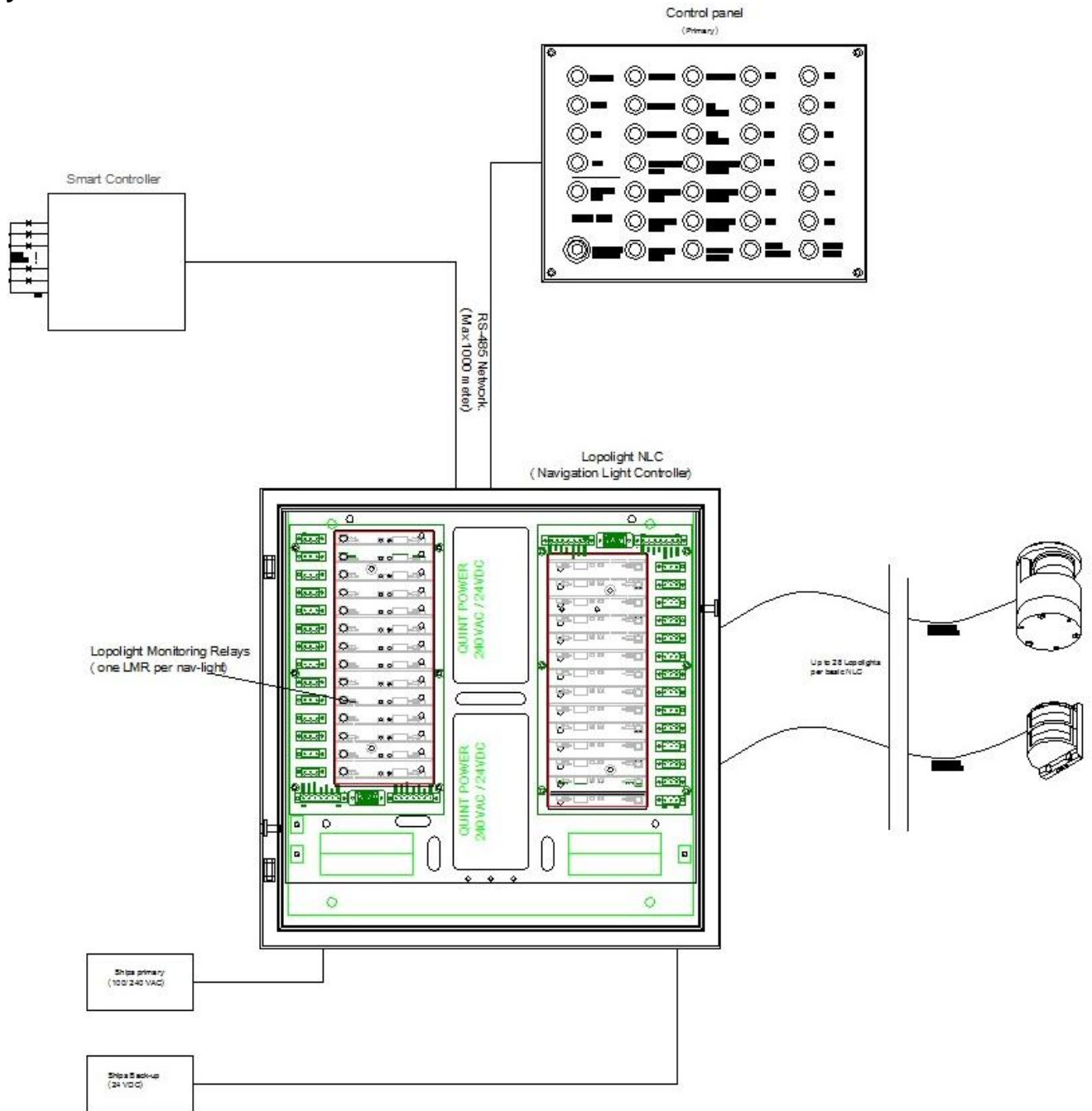
When a data telegram is sent from a given RS-485 host (typically a Lopolight control panel) to a dedicated node (typically a Lopolight LMR) then the corresponding output on the Smart Controller activates – thus mirroring the indicators on the control panel.

Input terminals: (toggle logic)

If an input is momentarily pulled down then the Smart Controller enters “host-mode”, a data telegram is generated and sent on the RS-485 port. The generated telegram addresses the logical node address that corresponds to the input name. (I.E. In.2 sends telegram to node number 2) with a “turn on” command.

Next time the same input is activated a similar telegram is generated, but this time as turn-off command.

1.3 System overview



2 Interface (refer to schematic P6)

			Outputs:	
Name:	Type:	Activation:	RS-485 (IN):	Remark:
Out 1	Digital	Pulls down	1	120R ¼ w resistor in series
Out 2	Digital	Pulls down	2	120R ¼ w resistor in series
Out 3	Digital	Pulls down	3	120R ¼ w resistor in series
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--	--	--	--	--
Out 28	Digital	Pulls down	28	120R ¼ w resistor in series
Out Gr.1	Digital	Pulls down	29	120R ¼ w resistor in series
Out Gr.2	Digital	Pulls down	30	120R ¼ w resistor in series
Out Gr.3	Digital	Pulls down	31	120R ¼ w resistor in series
Out Gr.4	Digital	Pulls down	32	120R ¼ w resistor in series
Out Res.	Digital	Pulls down	33	120R ¼ w resistor in series
Out Buz.	Digital	Pulls down		Buzzer for alarm indication

			Inputs:	
Name:	Type:	Activation:	RS-485 (OUT):	Remark:
In 1	Digital	Pull down	1	Toggles RS-485 telegram
In 2	Digital	Pull down	2	Toggles RS-485 telegram
In 3	Digital	Pull down	3	Toggles RS-485 telegram
--	--	--	--	--
--	--	--	--	--
In 28	Digital	Pull down	28	Toggles RS-485 telegram
In Gr.1	Digital	Pulls down	29	Toggles RS-485 telegram
In Gr.2	Digital	Pulls down	30	Toggles RS-485 telegram
In Gr.3	Digital	Pulls down	31	Toggles RS-485 telegram
In Gr.4	Digital	Pulls down	32	Toggles RS-485 telegram
In Reset	Digital	Pull down	33	Silences Out Buz and turns all outputs OFF if held 5 sec.
Panel dim	0-5V	10k potmeter		PWM dim all Outputs. (LED control)
Ex dim	0-5V	10k potmeter		Dims NPC and MTG based Lopolights. (digital)
PWR ok	Digital	Pull down (default, solder point)		Power supply monitor function

Com port:

RS-485, two wire, 38400,N,8,1
 485-A: connect to RS-485 "A" (or plus) wire in system
 485-B: connect to RS-485 "B" (or minus) wire in system

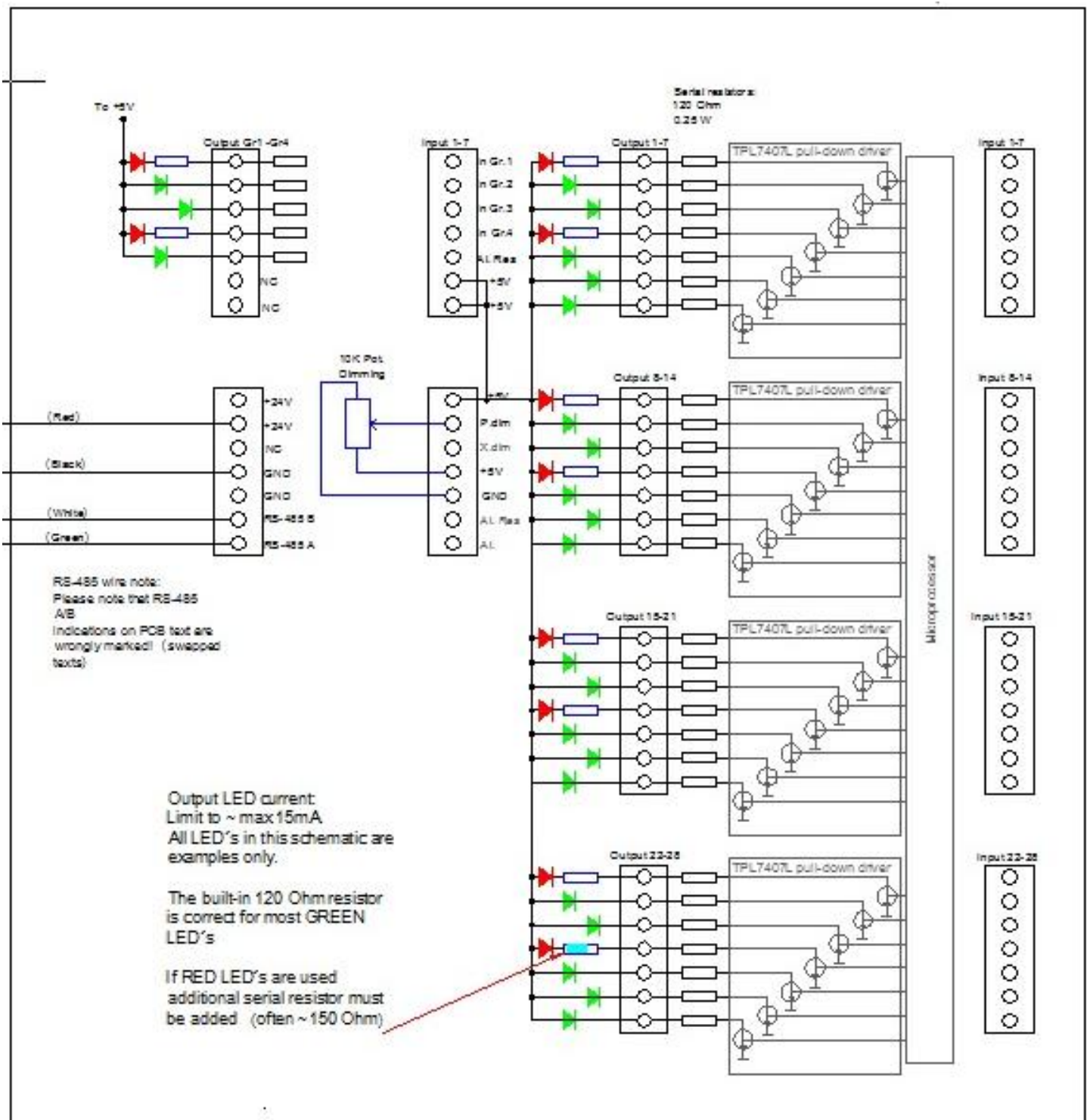
Note: A/B text on PCB [P/N:800-080 rev 1] are accidentally swapped..

Power:

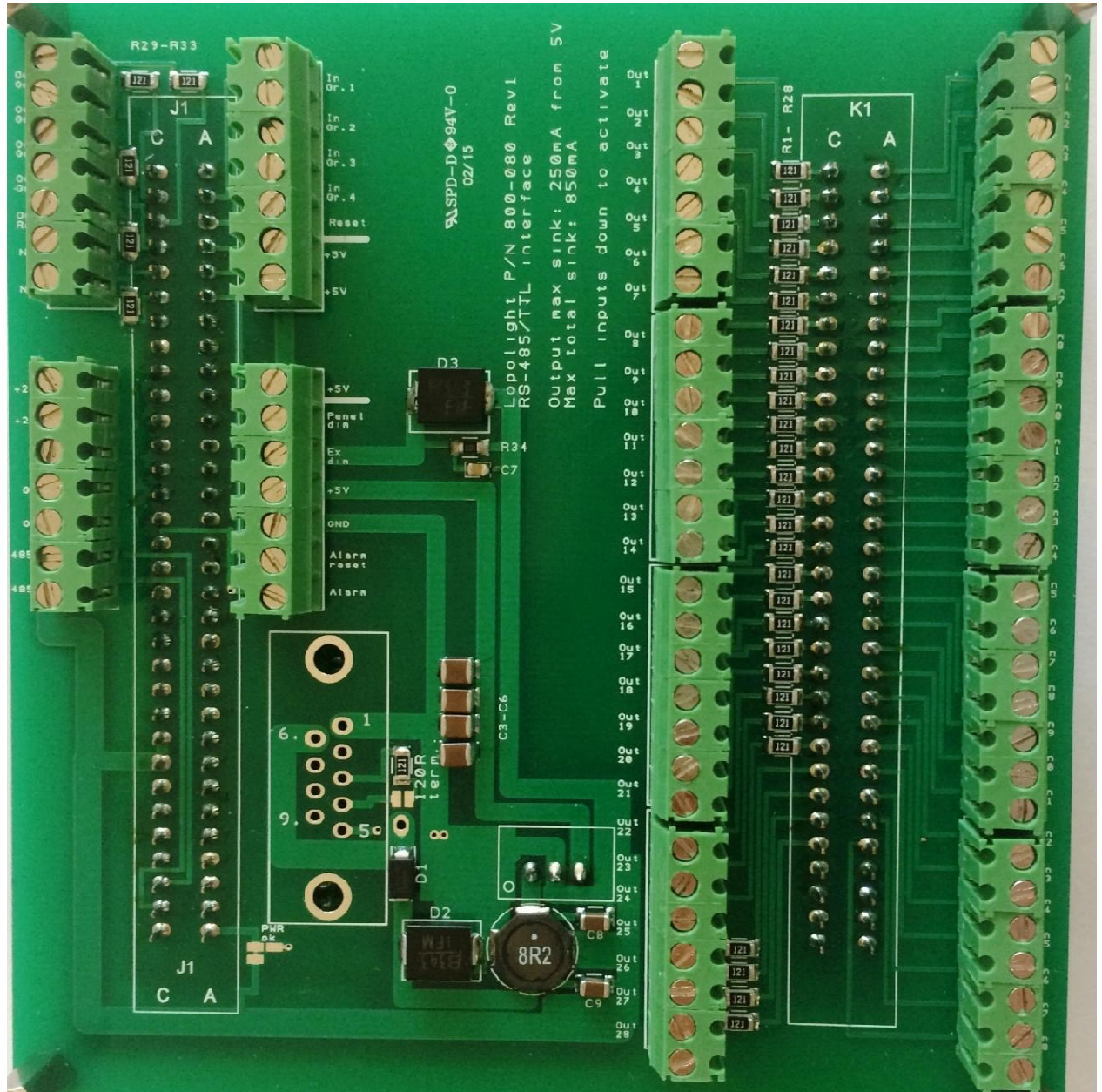
+24V, two identical terminals on PCB: Power to Smart controller and outputs. Accepts 10-32VDC
 GND, three identical terminals on PCB: 0V to Smart controller and outputs.

+5V, three identical terminals on PCB: LED power, (to LED`s connected to outputs). Max: 850mA

2.2 Physical connections:



2.3 Terminals:



3.0 Enclosure:

Cabinet: 3mm aluminium plates in sandwich construction
 Dimensions: 118*118*46mm
 Mounting: 4 pcs. 3.2mm screw holes
 Weight:
 Ingress protec. IP00 -must be mounted in cabinet by customer
 Colour: Black anodized

3.1 Controller power and connections:

Power-supply, 10-32VDC, screw terminals.
 Current: (own consumption):
 Outputs:
 Number of LED connections: 1 to 33 (28 individual channels)
 Max output current per output: 75mA*

3.2 Calculating serial resistor:

The Smart-controller holds on-board resistors mounted in series with the output. These serves as a basic current limiting component, and is designed to drive a typical green led. IF other LED-types are used it must be considered whether an additional serial resistor is needed. Below a few examples of the necessary calculations:

Basic formula to calculate additional serial resistor:

$$((V_{cc}-U_f)/0,015)-120=R_s$$

$$V_{cc}=5V$$

U_f (forward voltage of given LED)

$$0,015=15mA$$

120=standard on-board serial resistor

R_s =Extra serial resistor to be mounted in series with LED.

Example 1: Red LED with forward voltage 1.10V:

$$((5-1.1)/0,015)-120= 140 \text{ Ohm} \sim 150 \text{ Ohm. This must be mounted in series with the led.}$$

Validating power (example 1 only): (Power is limited to ¼ Watt only due to the nature of the on-board resistor:

$$(V_{cc}-U_f)*0,015=Power$$

$$(5-1.1)*0,015=0,06W \text{ -A lot less than the } 0,25 \text{ watt rating so OK!}$$

Example 2: Green LED with forward voltage 3.2V:

$$((5-3.2)/0,015)-120= 0 \text{ Ohm. The already on-board resistor will do the job, so no additional resistor!}$$

Data communication:

Physical: RS-485: 38400, N,8,1 (Data: protocol code "P")

Termination resistor: 120 Ohm , normally already in system in NLC box. Can be activated by over-soldering of pads on Smart-controller board. (Use only one per system).

* Note that a 120 Ohm 1/4W resistor is mounted in series with the output. This means that the maximum current is: $0,25W/(5-1.2)=65mA$ if a red led with a forward voltage of 1.2V is used. (65 mA will most likely burn a typical LED used for indication purposes).

4.0 Controller installation and first time set-up

The controller must be installed in a protected environment at bridge level. Cables and wires must be strain-relieved by external means.

Practical installation:

- 1) Unscrew the 4 pcs. M3 nuts holding the top cover.
- 2) Bolt the unit onto a suitable flat surface using the four free holes in the bottom part.
- 3) Connect the wires to indicator LED's, power, dimming potentiometer, and RS-485.
- 4) Re-connect the main panel.
- 5) Test system. Outputs on the Smart-controller should mirror the indicators on the main panel.
- 6) Refit topcover

NOTE: the indicator LED's will not work unless the dimming potentiometer is mounted! Set the pot-meter to middle position

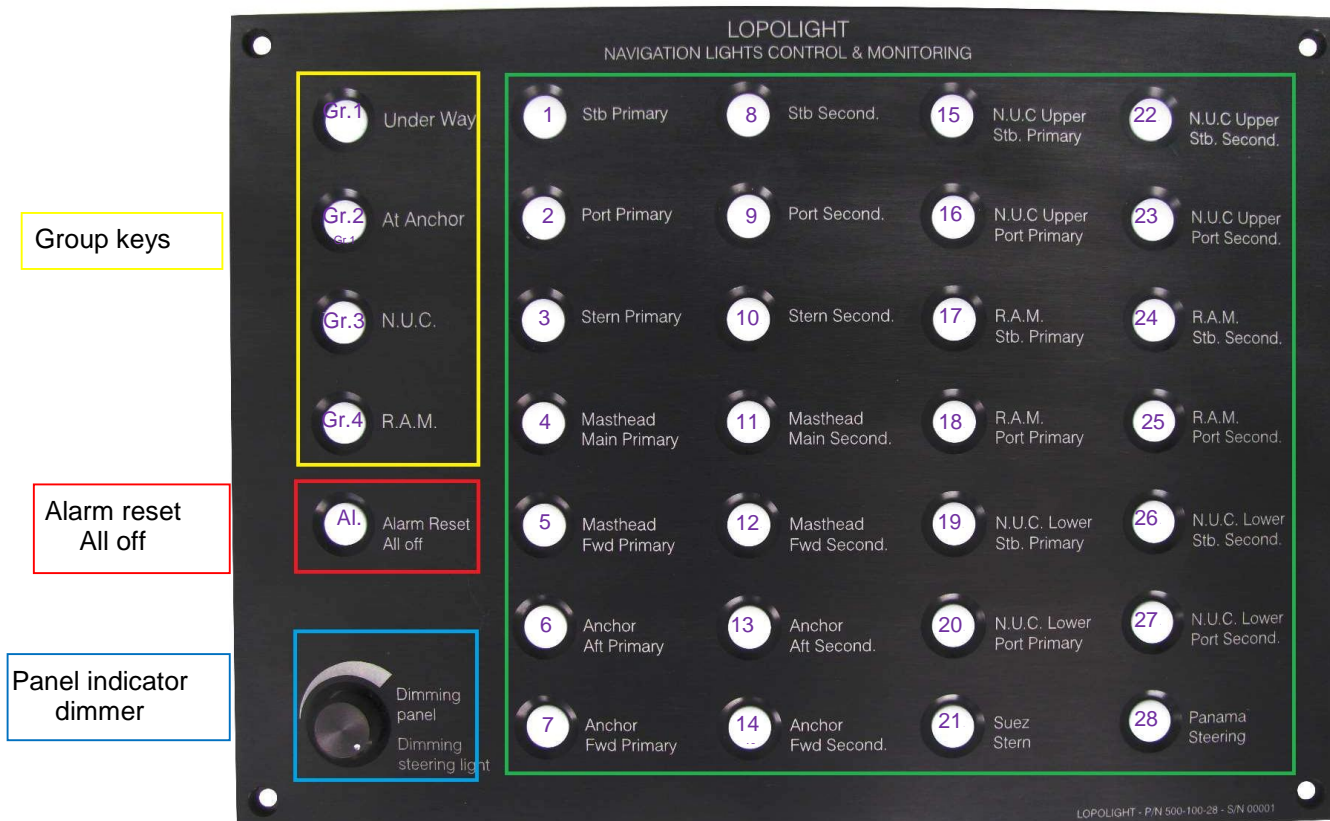
Now it works 😊

5.0 Logical keys:

Note the numbers of the green-framed keys of a typical main panel. The key marked “1” will activate output 1 on the smart-controller when pressed. (Key ”2” activates out 2, etc.)

The yellow-framed group keys: the key marked “Gr.1 Under Way” in this example activates out Gr.1. (Key: “Gr.2 At anchor” activates Gr.2 etc.)

Individual control keys. The logical number corresponds to position in NLC, and output of smart-controller



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