Medium Intensity GPS Quick Start Manual
For Use with DC version Side Lights
P/N D1RWCTR409GPS

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

- ***DO NOT let any supply cords touch hot surfaces higher than cord ratings.***
- ***DO NOT mount near gas or electric heaters***
- ***Equipment should be mounted in locations and at heights where it will not be subjected to tampering by unauthorized personnel.***
- ***The use of accessory equipment not recommended by the manufacturer may cause unsafe conditions.***
- ***DO NOT use this equipment for other than intended use.***
- ***DO take pictures of all wiring connections, junction boxes, controllers, mounting configurations. Failure to do so will void all warranties***

- ***The operation and maintenance must be carried out by authorized personnel.***
- ***Repairs and Installation must only be carried out by a qualified electrician.***
- ***Only genuine Dialight replacement parts must be used when unforeseen repairs are required.***
- ***Observe the national safety rules and regulations during installation!***
- ***Earth Grounding is required throughout the install process. Failure to do so could void all warranties!***
- ***No alterations should be done without the agreement from Dialight Corp. Alterations other than written in this manual will void all warranties.***

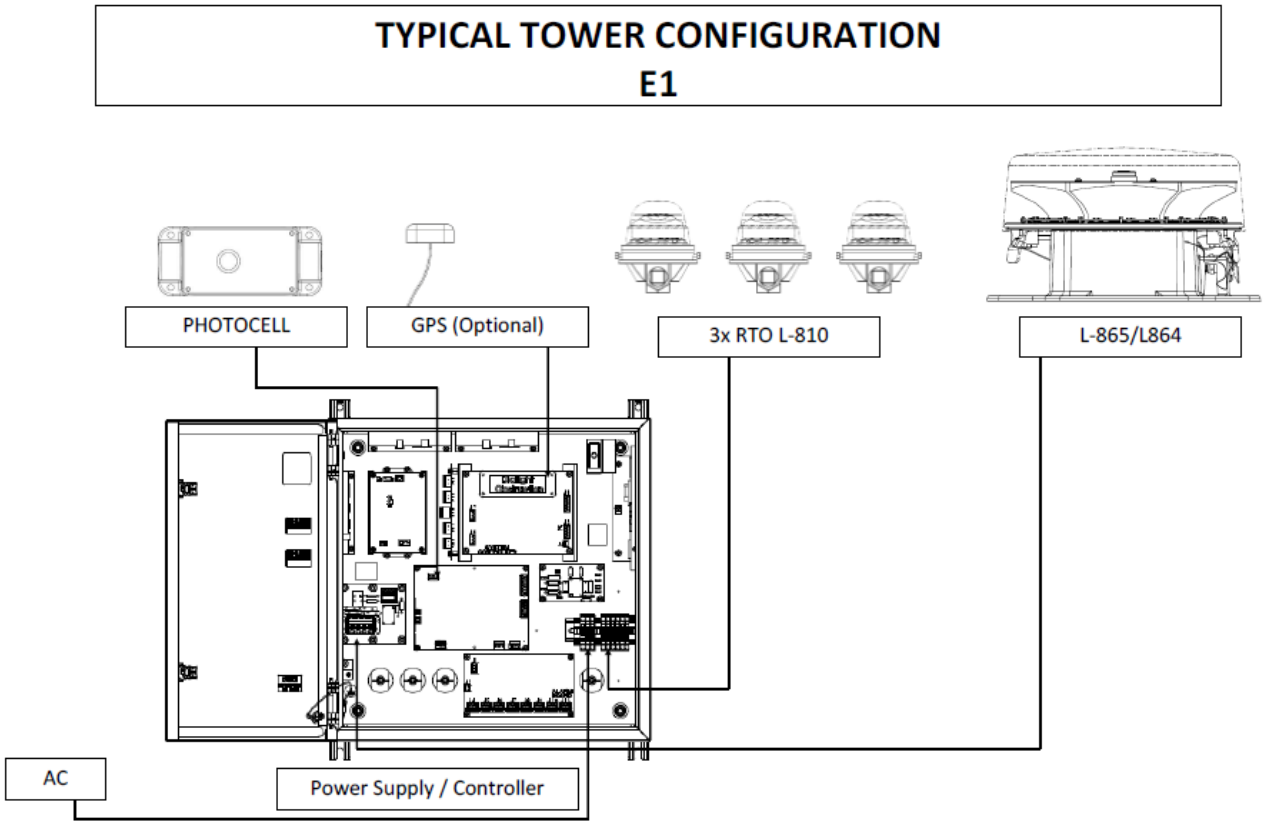
Introduction

This manual is for orientation and a quick guide to the installation process. There will be steps that are not detailed and the full installation manual MUST be used for more in depth installation instructions.

Included in this manual:

D1RW controller overview
Calibration of Side lights
Connection of the Photocell
Connection of the GPS Antenna
Event and Alarm views and meanings

System Overview:



Installation Tips and requirements:

For the Mains cable, it is recommended that the electrician or installer calculate the wire requirements based on the amount of Flash heads being installed. It is recommended that no install utilizes less than 16AWG wire with at least a 90°C temperature rating. See electrical parameters. Local Electric codes and wiring MUST followed.

Cable between the Dual Flash head and the controller must be a minimum of 14AWG and 4 conductors with foil and braid. (Supplied if a Kit P/N is ordered)

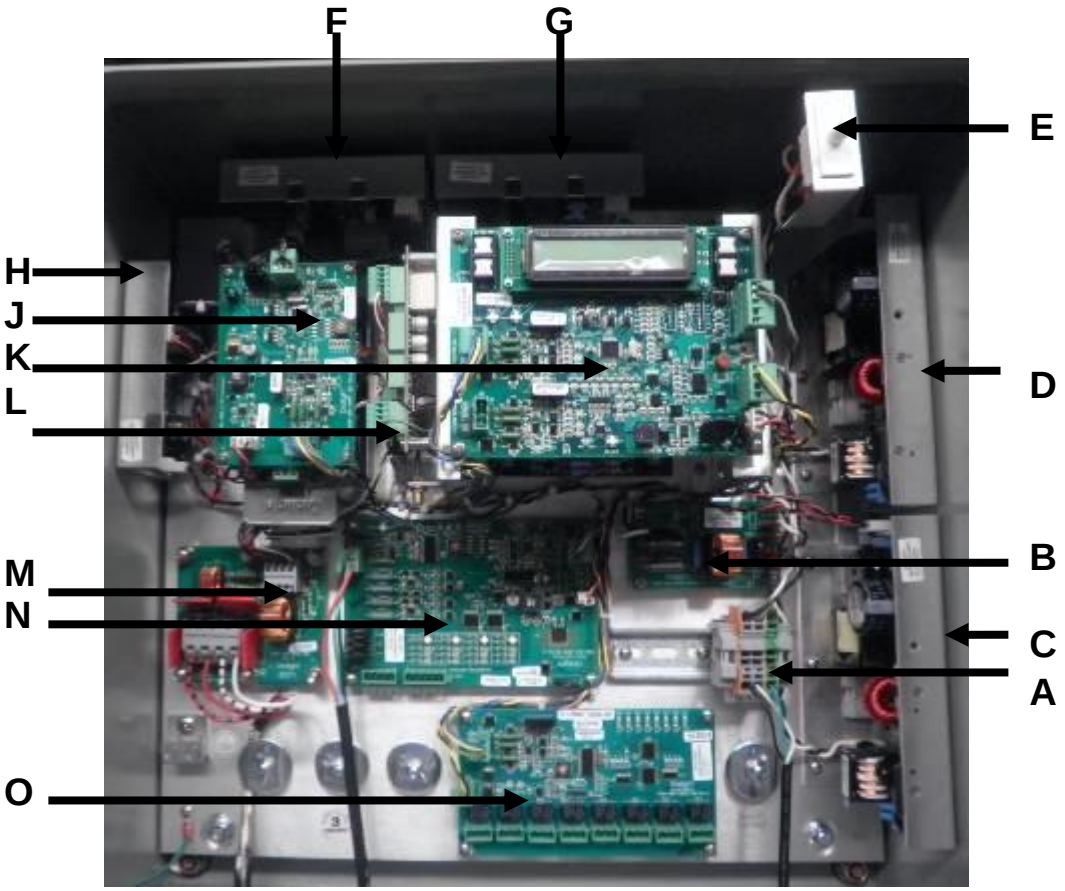
NOTE: Failure to do any of the above could void all factory warranties. If in doubt please contact your sales agent, representative or Dialight Tech support.

During installing on the tower proper grounding techniques should be utilized. The system has built in Lightning and RF immunity at each section, but for it to be effective proper ground connection techniques must be used. For more details contact your local sales rep.

D1RW Controller Layout:

NOTE: See electrical specifications for power consumption and electrical recommendations.

A	AC Input Terminal Block
B	Ac Surge Protection
C	1st 48Vdc Ac to DC Converter
D	2nd 48Vdc AC to DC Converter
E	Interlock Switch
F	White Driver # 2
G	White Driver # 1
H	Red Driver
J	Translator Board
K	LCD Board
L	GPS Input Board
M	Flashhead Surge Protection
N	Side light Monitor Board
O	Relay/Dry Contact



Connection of AC Mains Power and RS485 Communications:

The Enclosure is supplied with 8 predrilled holes to accommodate the Main cord, the RS485 communication cable, Photocell's input, GPS antenna cable and relay outputs

NOTE: Certain holes may not be required for all installation types thus all unused holes must be sealed with supplied blanking plugs and properly tightened to avoid water or moisture entering the enclosure.
If additional holes are required then they can be located in any convenient location for the user and installer. If installed outdoors water ingress must be considered.

NOTE: If there is existing AC and RS485 communication (when required) in the vicinity of the Base Controller installation then these cables can be used if they meet the requirements in this guide.

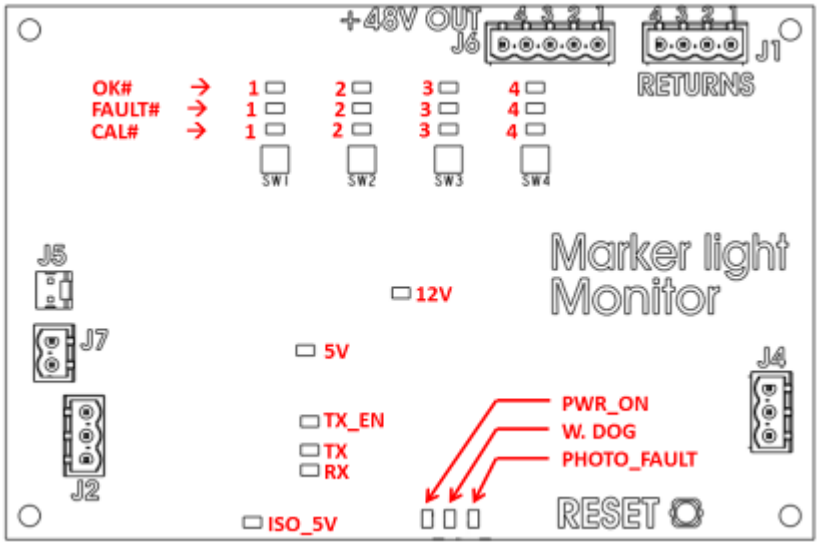
NOTE: Multiple grounding points are provided in the enclosure for protective and functional Earth/Ground connections.

Connection of the Marker Lights (L810's) to the Side Light Monitoring Board:

WARNING: DC Voltage L810's are to be used for connecting to this system!
NOTE: Dialight Part number is RTO-1R18-001

LED Status Indicators on the Monitor Board

LED Label	Color	Status
PHOTO_FAULT	RED	ON = Photo cell is not connected or in fault
		OFF = Photo cell is connected and working
W. DOG (Watchdog)	GREEN	BLINKING = Microcontroller is working
		OFF = Microcontroller in fault
PWR_ON	GREEN	ON = Board is powered
		OFF = Board is not powered or in fault
ISO_5V	GREEN	ON = 5 Volt DC rail is working
		OFF = 5 Volt DC rail is in fault
5V	GREEN	ON = 5 Volt DC rail is working
		OFF = 5 Volt DC rail is in fault
12V	GREEN	ON = 12 Volt DC rail is working
		OFF = 12 Volt DC rail is in fault
TX (Transmit)	GREEN	BLINKING = Monitor Board is transmitting data
		OFF = NOT transmitting data (Fault)
RX (Receive)	GREEN	BLINKING = Monitor Board is receiving data
		OFF = NOT receiving data (Fault)
TX_EN (Transmit Enable)	GREEN	BLINKING = Monitor Board acknowledge transmit
		OFF = NO acknowledge of transmit (Fault)
OK# (RTO Output #)	GREEN	ON = RTOs are present and working
		OFF = RTOs not present
FAULT# (RTO Output #)	RED	ON = RTOs are in fault (low current)
		OFF = RTOs are working or not present
CAL# (Calibrate RTO Output #)	AMBER	ON = RTOs are ready to calibrate
		OFF = RTOs are working, not present, or in fault



LED LOCATIONS

Calibration Steps for L810 Side Lights:

Follow these steps to calibrate the Marker Light Monitor Boards located in the Main Controller. These steps will allow the system to properly identify, power, and monitor the RTO L810 side markers.

STEP 1 – CLEAR the Marker Light Monitor Board by holding down buttons SW1-4 at same time.

STEP 2 – FAULT LEDs #1-4 will light up red.

STEP 3 – Press "RESET" button (SW7).

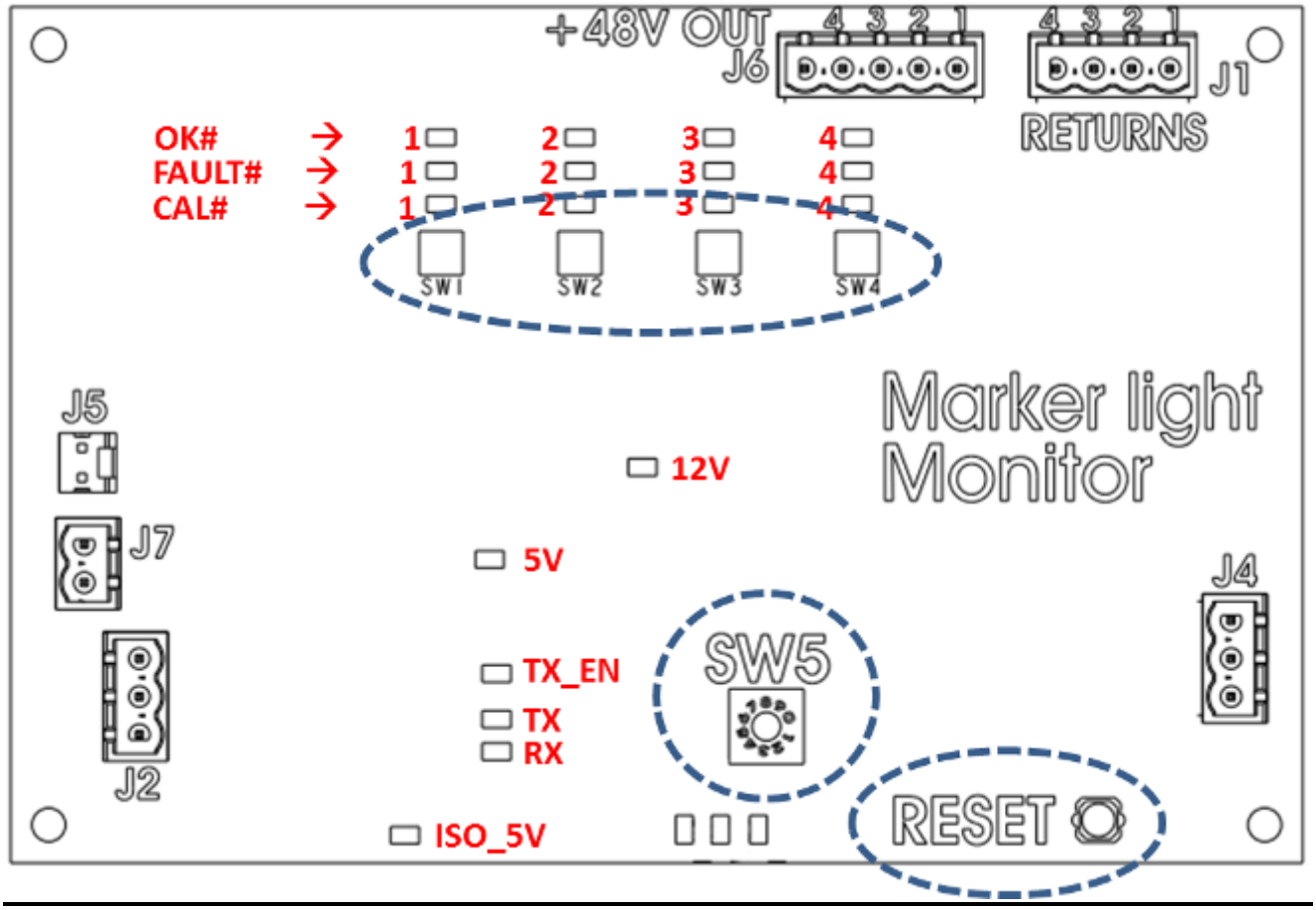
STEP 4 – Each output will auto configure within 15 seconds.

STEP 5 – Verify Each output is correct:

Green "OK" LED will illuminate green if RTO output is present.
"OK", "FAULT", and "CAL" LEDs will be off if RTO output is NOT present

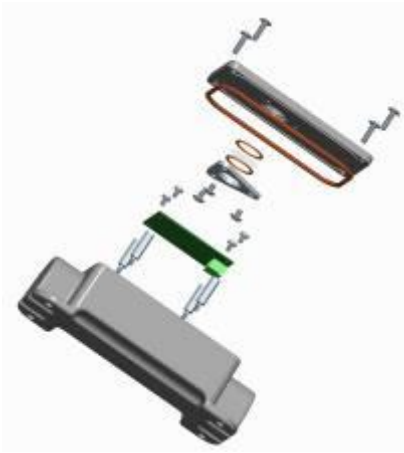
WARNING: If calibration is NOT completed then the system will not log events or Alarms for faulty Side lights.

NOTE: If calibration of the side lights is not performed the default is that the side lights will turn ON at night but no events or alarms will be logged

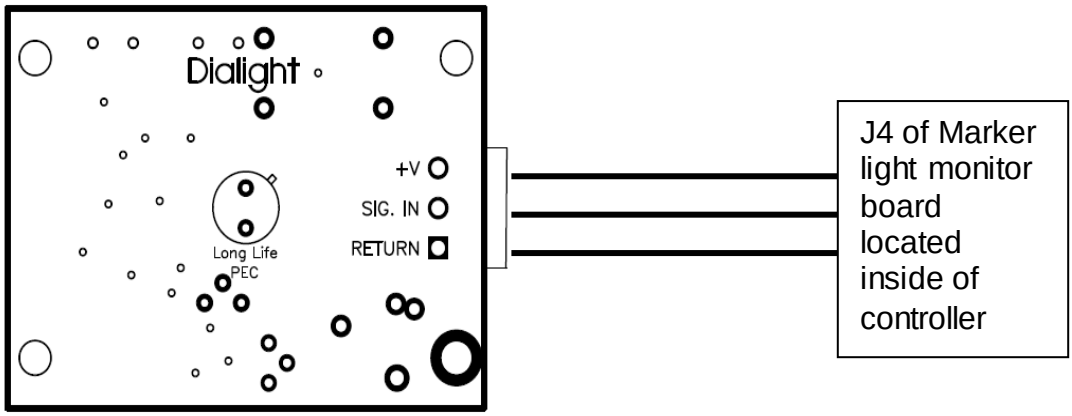


MARKER LIGHT MONITOR BOARD SHOWING BUTTONS AND SWITCH FOR CONFIGURATION AND CALIBRATION

Photocell Connection: Dialight P/N D256-600xPEC



Open supplied photocell enclosure. The Photocell requires 3 connections to be made to the inside of the photocell enclosure itself and 3 inside the controller.



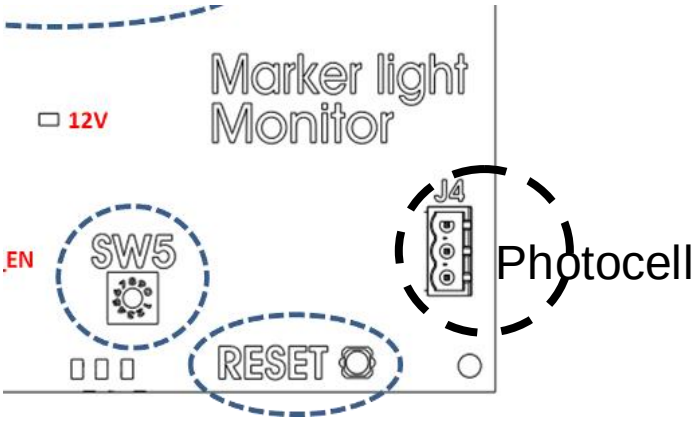
TOP VIEW

+V = 12Vdc (supplied from controller)
SIG. IN = Sense voltage relayed to controller
Return = Ground

Cable Requirements:
3 conductor, 18AWG
Maximum allowable distance is 500 feet from the controller

The photocell comes supplied with one end threaded for ¾" NPT conduit, which is recommended for installing the photocell. If a cable is used without conduit in a hazardous location installation then the cable at minimum MUST have either a shield or braid that is properly connected to body of the photocell and to the enclosure of the controller it is being installed to. Failure to properly ground or use a cable without the shield or braid will void all warranties and the product could be subject to premature failures.

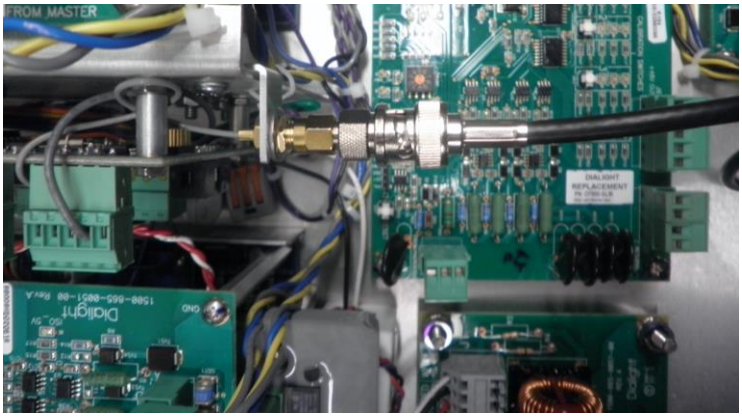
When installed the Photocell must face north and have an unobstructed view of the northern sky.
NOTE: For testing and troubleshooting purposes refer to the Photocell manual



GPS Antenna Connection to the Controller:

NOTE: REFER to GPS Antenna manual for mounting GPA Antenna to Photocell Enclosure

Located in the controller mounted to the side bracket of the LCD board there is a BNC connector that accepts the cable from the GPS antenna, Picture shown below.
NOTE: This is the only connection required for the GPS inside the controller.



WARNING: The cable can NOT be cut or shortened in any way. Any extra cable that is left because of the proximity of the antenna MUST be gathered, tie wrapped and stored in the Controller. See picture below

Bundle excess GPS cable and store in bottom part of Enclosure

LCD Display:

The Startup Screen displays:

Dialight GPS MI Ctrl REV. x Build: xx

NOTE: The Site manager and Installer should take a note of this screen if any troubleshooting is required.

The Initializing Screen:

This screen shows a countdown for the initial 15 flashes for E and D type structures. A type (Red only) counts down from 45 Flashes

Initial 15 Flashes In Process

Initial 45 Flashes In Process

Main Menu Screens:

Allows the user or maintenance personnel to view, configure or access the displays by pressing the “Ent” button.

Configuration Type Screen:

This screen allows the installer to change the factory default settings based on the system being installed.

A) To change configuration of controller go to 'Config Type' screen' and press enter.

CONFIG TYPE E 'Enter to change'

B) External GPS: using the up/down select Yes or NO and press enter.
For the D1RWCTR409GPS the factory Default is YES.

NOTE: If for some reason the GPS is faulty then by selecting NO the system will operate correctly but will not synchronize to other Dialight systems

Ext GPS = YES u/d=chg, enter=done

C) Use up/down button to scroll and select tower style A, D, or E. Then press enter.
NOTE: If 'Tower Style D' is selected the next setup screen is step
NOTE: System will Reset when tower style is change

Tower style = E 'enter' to change

D) Use the up/down buttons to select the number of side light tiers/levels that will be connected to system, and then press enter.
NOTE: Selection option is 1-4
NOTE: E1 selection should 1
E2 selection should be 2

Num of 810 Tiers = 1 u/d =chg, enter done

E) Select the number of L810's (total side lights connected to Port 1 of the Monitor board) 0 through 4 and then press enter
NOTE: Repeat for ports 2/ Tier 2 , Port 3/Tier 3 and Port 4/Tier4
NOTE: Port 1 thru 4 all the total side lights on each level of the structure.

NUM 810 P1/T1= 3
u/d =chg, enter=done

F) Select the number of beacons that will be a part of the system, 1 through 9 and the press enter.
E1 = 1 864/5
E2 = 3 864/5
E2+1 = 4 864/5

Number of 864/5=1
u/d =chg, enter=done

G) Select the number of side light (Monitor boards) boards that are connected to the system, 1 through 9 and the press enter.
Factory default is set to 1
NOTE: There has to be at least 1 of the Monitor boards in the system.

Number of SD BDs=1
u/d =chg, enter=done

Screen: Tower type E1 or E2:
NOTE: The Base Controller auto detects what type tower is being installed. Only powered fixtures and fixtures connected to the RS485 will be detected.

The display shows what the installer selected during the configuration process

B4= Displays the present Firmware version of the Controller.
NOTE: The version may change

Tower Style: X
X 865/4 , X 810 B4

Screen: Mode of operation: Day, Night and internal Temperature
NOTE: The modes change according to the user's photocell operation. There are no options for preprogramming select times.
Temperature is displayed in Celsius for informational purposes only, there are no alarms or user selectable options for this.
Mode: Options are Day or Night
Active: Options are Wht or Red

NOTE: On this screen the controller can be forced in DAY or NIGHT (using the push buttons marked White and Red on the LCD board below the up/down buttons) with an approx. 2minute time out
All buttons except for the "CLR" will be frozen till the forced times out or the "CLR button is pressed to resume normal photocell operation

MODE: Night T=+25 C ACTIVE: RED 864	MODE: Night Forced 'Clear' to Restore

NOTE: The word forced is added to the display when the photocell is bypassed for manual forced operation.
WARNING: During Forced operation the Photocell is by passed thus the installer must still test the photocell for proper operation

Status Screen of Alarms:
NOTE: If an Alarm is found, the Status screen will change from "NORMAL" to "ALARM" to indicate there is an active Alarm.

By pressing "Ent" you will be able to view alarm logs. Time stamps are actual times that the alarm occurred. **Refer to interpretation of the logs for further details**

Status: Normal 'Enter' to view Alrm	Status: Alarm 'Enter' to view Alrm

Setting the real time clock:
By selecting "Ent" the user can set the actual time and date of the Base Controller.
NOTE: This may come pre set from the factory for either East or West Coast time.
NOTE: After setting the time the Micro board has a battery, so if for some reason the Base Controller needs to be powered down the time and date is kept.

MMM DD,YY "Time" 'Enter' to set Clock

Error/Event Log:
This screen allows the user to enter into the log screen that shows all the Events that have occurred during a given time stamp. When entering the screen the highest or most recent log will be shown. By using the up or down keys the user can scroll back 127 entries before the screen rolls back to the latest recorded entry.
NOTE: If for some reason the highest entry cannot be found press the "Clr" button once to exit the log and then press the "Ent" key to return to the highest log.

Press 'Enter' Key to view event log.	E May DD, YY HH,MM,SS 1 Logs Cleared

Controller Status LED's; Located on Main Micro with LCD display
Note: Actual colors shown may not match system being installed

STATUS LED ASSIGNMENTS

S7	S6	S5	S4	S3	S2	S1
COMM Failure RED	SYNC Failure RED	25% LED Failure RED	ALL 810 OFF Failure RED	Photocell Failure Day/Night RED *BLINKS	EXT SYNC Failure AMBER	Heartbeat Flashes GREEN

NOTE: These are real time leds, in some cases these fault leds will light before the dry contact alarm leds AL1-AL7

***NOTE: During force mode operations S3 will blink till the "CLR" button is pressed or the system defaults back to normal Photocell operation.**

Relay Board Alarm Dry Contact LED's:

STATUS LED/dry contact ASSIGNMENTS

AL8	AL7	AL6	AL5	AL4	AL3	AL2	AL1
PEC MODE Amber	L 810 FAILURE Red	Trans COMM Failure Red	Day/Night transition Failure Red	PEC LOST Red	25% FAILURE Red	Sync Failure Red	Sidelight COMM Failure Red

E1 System Box Electrical Parameters:
Qty 1 D1RWCTR409GPS
Qty 3 RTO-1R18-001

Nominal Supply Voltage (VAC)	Conditions	Watts
230Vac 50/60Hz	Day mode (E1- system)	Max 90W
230Vac 50/60Hz	Red night mode (E1- system)	Max 67 W
230Vac 50/60Hz	white night mode (E1- system)	Max 33 W
120Vac 50/60Hz	Day mode (E1- system)	Max 90W
120Vac 50/60Hz	Red night mode (E1- system)	Max 67 W
120Vac 50/60Hz	white night mode (E1- system)	Max 33 W

Flash Rates:

Structure Types	Day	Night
E Configurations	40FPM	20FPM
D Configurations	40FPM	40FPM
A Configurations	N/A	20FPM

Mains AC Power Resetting:
Power on Resetting (i.e. switching power off then on again) is required when addresses to Translator, Monitor or Relay boards are changed or power is lost

Push Button Reset:
The Reset Button is a firmware re-boot that causes the Controller to do a complete re-start. This reset is most often used when power is either lost or required to be shut down for a period of time. This reset will go through the full warm up and the initial 15 flash countdown menu.

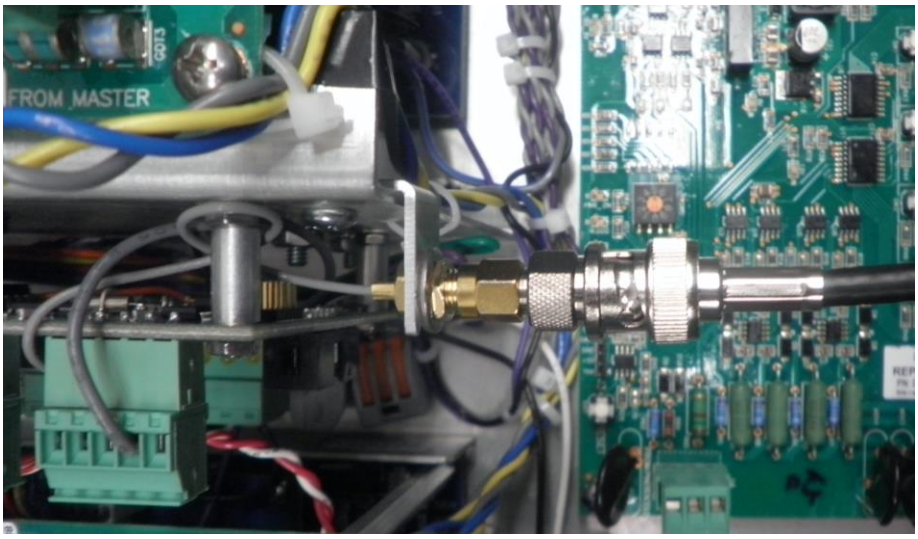
NOTE: Pressing the Rest button is required after calibration of the side light monitor board. This process sends the recorded values to the LCD.

Ext Antennae Input:
This connection will synchronize the System with other Dialight GPS enhanced systems or can be ran by itself and then other structures can be added later thus synchronizing the structures together.

Once the Antenna is connected to the BNC connector located in the controller, the EXT GPS configuration must be set to YES to use the GPS for synchronized flashing.
If the GPS lock is lost the Controller will resume the flashing of the system till the GPS lock is restored.

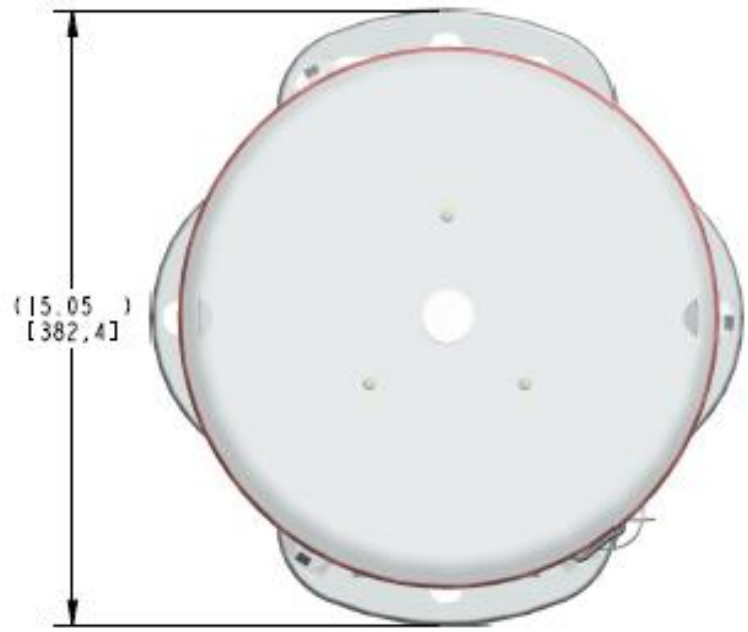
NOTE: If GPS lock is lost for more than 2 minutes than an Alarm relay on the Dry contact is engaged. If the lock is restored the Alarm will clear.

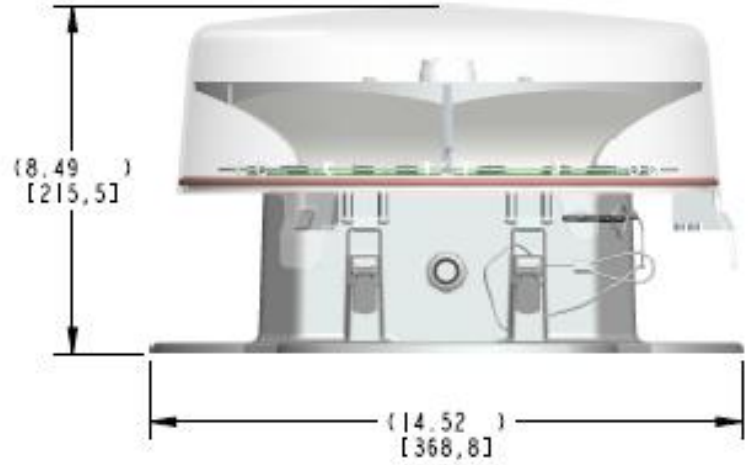
NOTE: During initial power on, while installing and power outages it may take sometime for the system to re lock to the GPS signal.



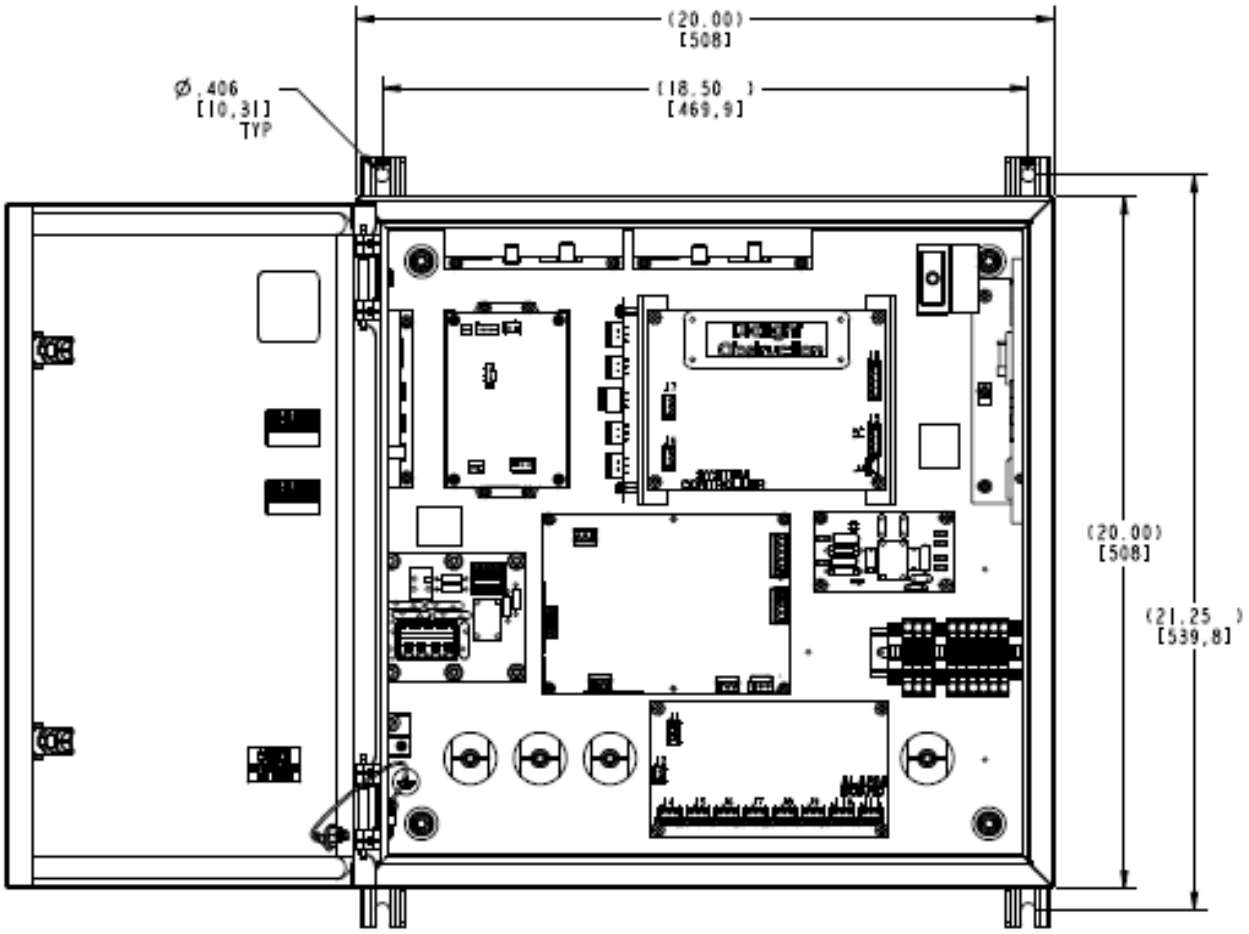
BNC Connector for connecting GPS Antenna to Controller

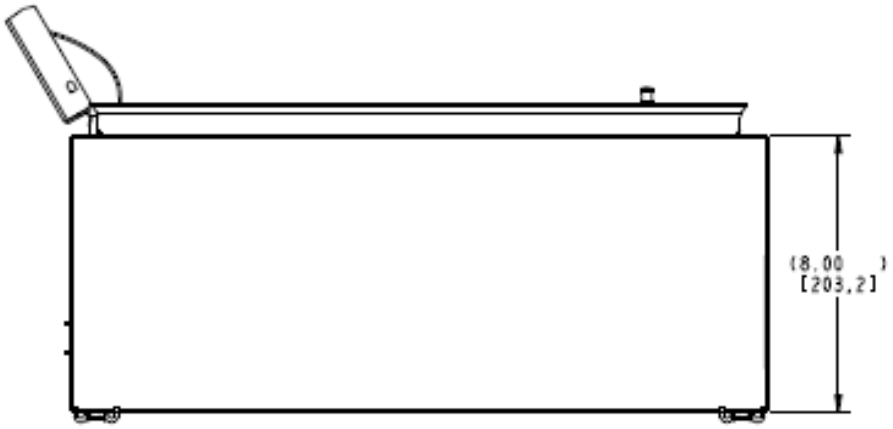
Mechanical Dimensions of D1RW L864/865 Flash Head:



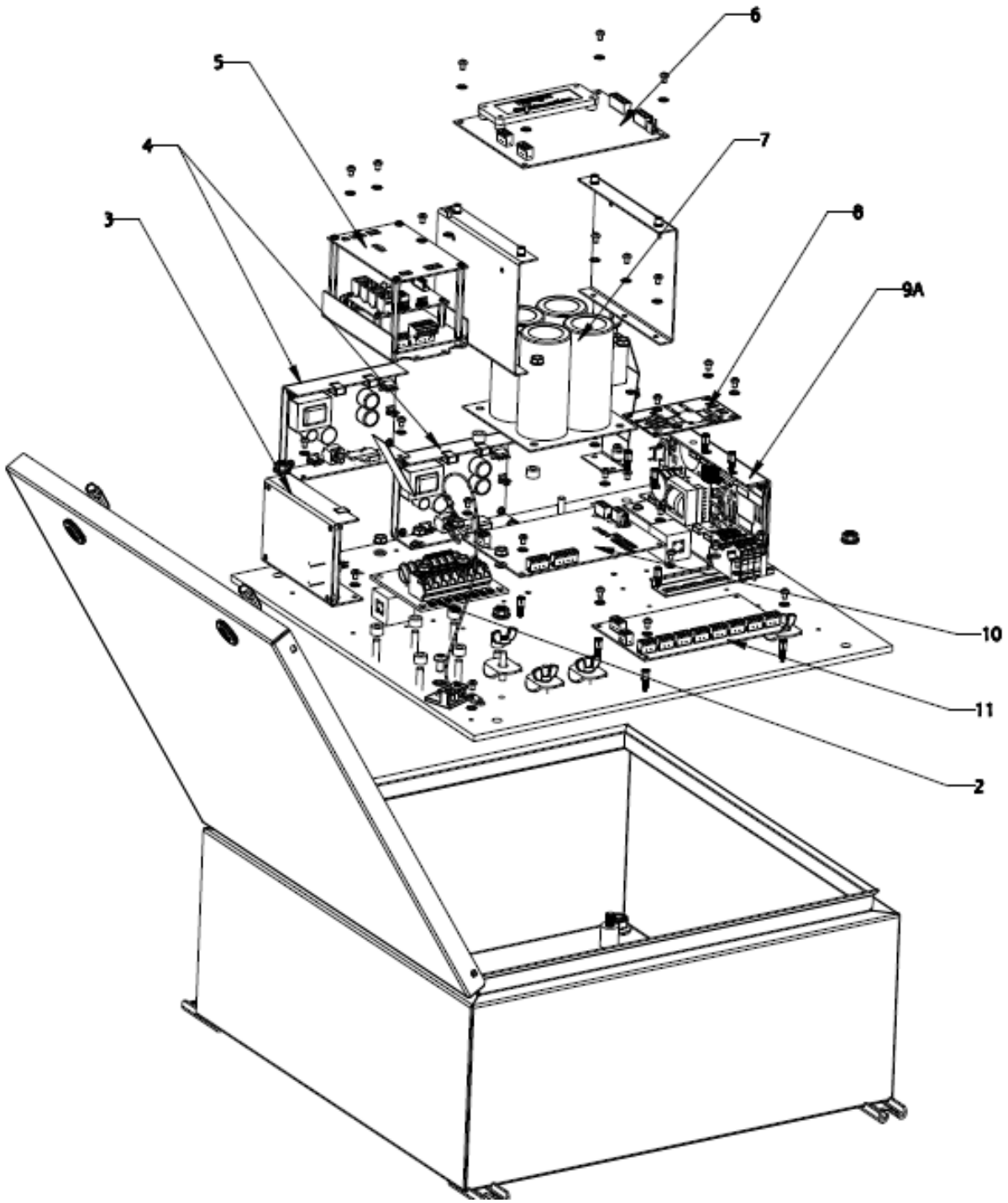


Mechanical Dimensions of D1RW Controller:



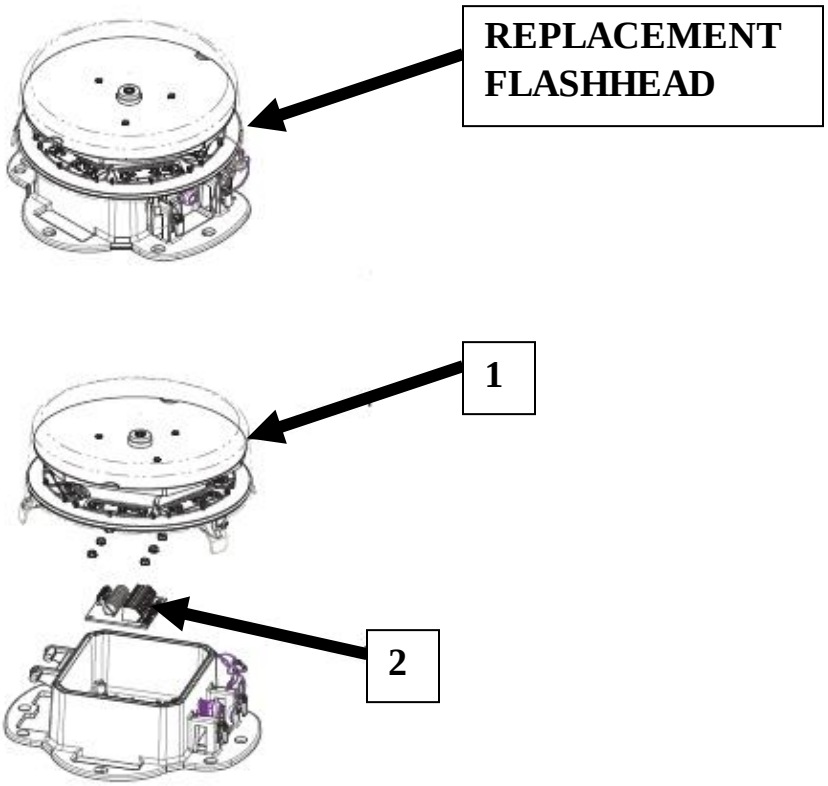


Replacement Part Numbers FOR D1RW-CTR-409GPS



FLASH HEAD

RED/WHITE 4 CONDUCTOR: D1RW-FH-409 (1)



ITEM	Replacement Description	Replacement P/N
1	Replacement Lamp	D1RW-1020
2	Lighting Protection Board	D7203-SUR (4CONDUCTOR
3	Red Driver	D1RW0084RA
4	White Driver	D1RW0084WA
5	Micro / Filter/ Translator Assy	D7301-ASY
6	LCD Main Controller	D7406-LCD
7	Capacitor Board	D1RW0084CP
8	AC Input Filter Surge	D7202-SUR
9A	48Vdc Converter	D1RW9005RA
10	Side Light Monitor Board	D7502-SLM
11	Dry Contact Relay Board	7601-RLY

Display Events and Alarm descriptions:

Navigating the Display

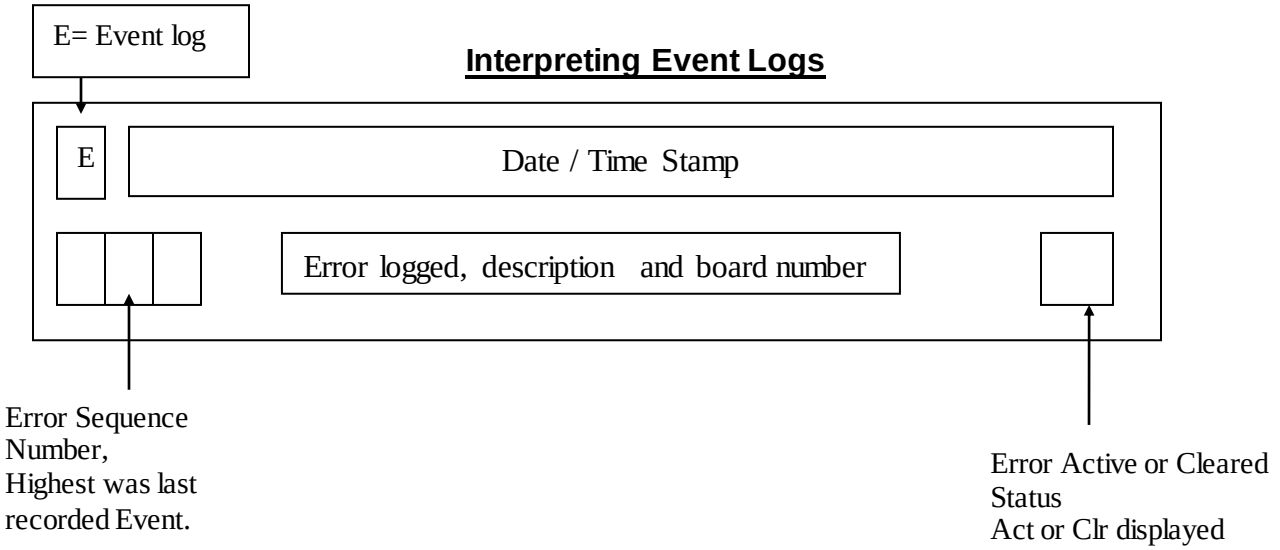
Up/Down: Buttons scroll through menu options, or Log entries

Enter: Selects a menu

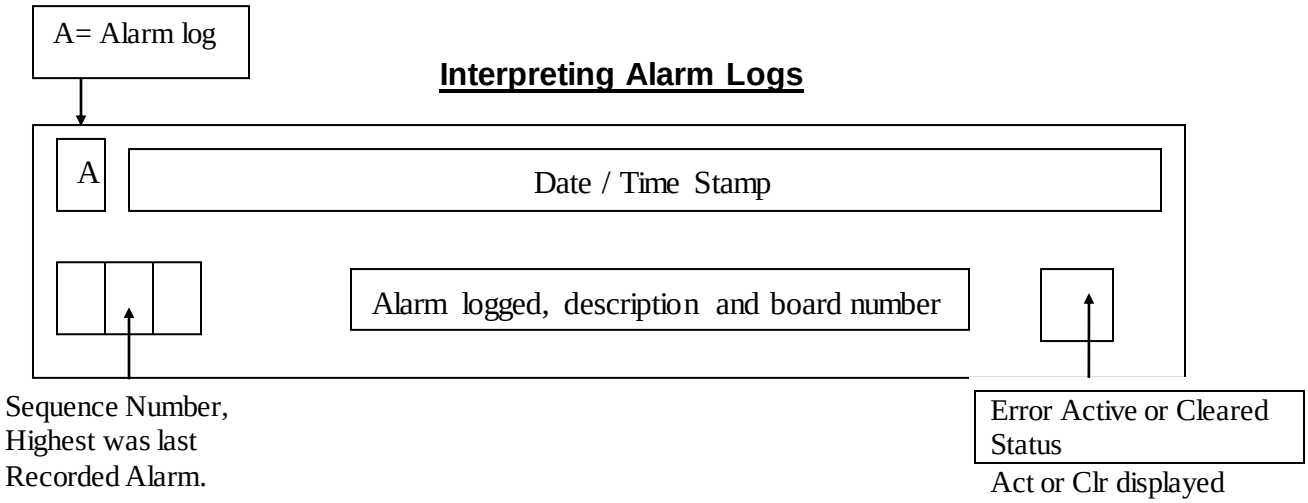
Clear: Exits a menu and returns to previous screen
Clears error/alarm registers

Holding the Clear button for 5 seconds when in the Event or Alarm log clears the given Log data. The first recording will be displayed as "Logs Cleared"

Interpreting Event Logs



Interpreting Alarm Logs



NOTE: The above are separate screens shown on the LCD both logs are individually accessible

Alarm List:

Error	LCD Alarm display	Description	How to generate it	Corresponding Dry Contact
D1RW COMM	TRNS Comm 1	Comm Alarm	Remove J1 (RS485) from the translator board(8800-865-3150-00)	Alarm 6
Side Marker Communication	SDLT Comm 1	Side light board did not communicate to the LCD board	Loose connection on J2 on the monitor board Check TX,RX Tx-EN are blinking	Alarm 1
No Photocell	PEC LOST	Photocell not detected	Removed connection from J4 of the monitor board, mis-wired connections, damaged photocell	Alarm 4
Day to Night transition	Day to Nite	There was an issue with the transition from Day to Night	Photocell did not switch modes for more than 18 hours	Alarm 5
Night to Day transition	Nite to Day	There was an issue with the transition from Night to Day	Photocell did not switch modes for more than 18 hours	Alarm 5
Side Markers out	ALL 810	All Side Lights on a level are out	Side lights are not turning on for a whole level. Check J1 and J6 of the Monitor board	Alarm 7
25% White	865 W25% 1or 2	25% of the white LED's are out	Disconnect J2 off of White driver 1 Or Disconnect J2 off of White driver 2	Alarm 3
25% Red	864 R25% 1	More of the Red LED's are out	Disconnect J2 off of Red driver System will go to back up white night	Alarm 3
RS232	TRNS RS232 1	Translator board connection to the micro-board is missing	Disconnected Cable (J4) on the Translator board	Alarm 6
Relay Board Communication	RLY Comm 1	Missing communication to Relay board	Check J1 (RS485) of the Relay board , check that leds TX RX and TX_EN are blinking	All dry contacts will be all be tripped

D1RW Sync Alarm	External Sync Lost	Sync input pulse is missing from Antenna	Check J5 from the Translator board, check GPS connection inside of Controller, check GPS antenna	Alarm2
Side Marker 1 off	1st 810 1	Side Marker 1 is not on	Faulty 1st RTO from J1 of the monitor board Check wiring and light itself	N/A (Event)
Side Marker 2 off	2nd 810 1	Side Marker 2 is not on	Faulty 2nd RTO from J1 of the monitor board Check wiring and light itself	N/A (Event)
Side Marker 3 off	3rd 810 1	Side Marker 3 is not on	Faulty 3rd RTO from J1 of the monitor board Check wiring and light itself	N/A (Event)

QUARTERLY LIGHTING INSPECTION TEST:

This is only done when a NOC has been setup to do this test. If a Dialight Gateway is installed then the test can be completed remotely.

MANUAL QLI TEST:
NOTE: A NOC has to authorize the manual test 1st.
System needs to be in Day mode
Test will time out after 2 minutes of due to the lack of user input during then manual test.

Have the NOC authorize QLI

Press enter

Press' TEST WHITE' button located under the 'Down' on the LCD controller circuit board

Cover photocell, wait until beacon turns Red or White Nite.
Wait for 15 flashes and then press the TEST RED button.

MANUAL QLI TEST
push RED BTN

Press the 'TEST RED' button

MANUAL QLI TEST
IN PROCESS RED

OR

MANUAL QLI TEST
IN PROCESS NWHT

MANUAL QLI TEST
PASS :)

OR

MANUAL QLI TEST
FAIL : (

MANUAL QLI TEST
QLIT DONE

System will return to configuration screen when test is completed.
System will reset within 5 minutes of test completion
NOTE: If the OLI manual test is not completed due to prompts not being followed, tests will time out after 5 minutes and display:

MANUAL QLI TEST
QLIT NOT DONE

REVISION HISTORY

REV	ECO No.	DRN	CKD	APP	QA	CM	DATE
A	33136	CAG	SA	CV	RA	JN	3/1/16
B	64576	TLD	AV	AR	YS	JN	12/11/19