For the E/F/G Series and legacy R247-E/R920/SC315 systems
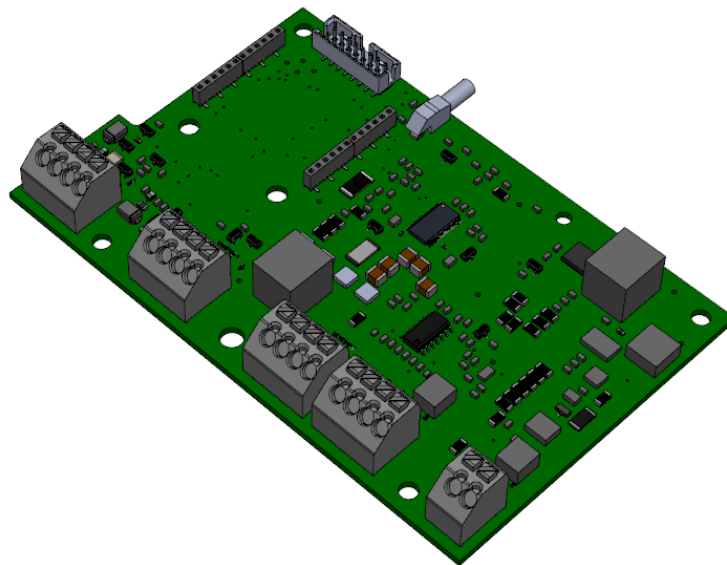
84331_REPLACEMENT_GUIDE_EMS_REVC

This page left intentionally blank.

Table of Contents

1.0 Warnings and Precautions

The following symbols indicate important safety warnings and precautions throughout this guide:

WARNING indicates that serious bodily harm or death may result from failure to adhere to the precautions.

CAUTION indicates that damage to equipment may result if the instructions are not followed.

NOTE suggests optimal conditions and provides additional information.

1.1   Warranty Disclaimer

This guide will familiarize you with the features and installation of Carmanah's unified Energy Management System (EMS). Failure to comply with the use, storage, maintenance, installation or placement instructions detailed in this guide could void the warranty.

1.2   Standards

Perform all installation, wiring, grounding and maintenance in conformance with local building and electrical codes. Adherence to the National Electrical Code (NEC) is mandatory to comply with any certification markings. Non-adherence to code may void the warranty.

1.3   Safety and Usage Precautions

Use extreme caution when handling the batteries as they can generate hazardous short-circuit currents. Remove all jewelry (bracelets, metal-strap watches, etc.) before handling the batteries.

Solar panels produce DC electricity when exposed to light and can therefore produce an electrical shock or burn. To render solar panels inoperative, remove them from sunlight or fully cover their front surface with an opaque material.

Before lifting any heavy or bulky equipment, ensure the load is secured so moving parts do not shift, and that it can be lifted as far as needed without back strain or loss of grip. Installation may require more than one person.

Ensure the equipment is not powered during installation and wiring of the system.

WARNING Recheck all completed wiring for proper polarity prior to energizing the system.

NOTE Changes or modifications to Carmanah equipment not expressly approved by Carmanah could void both the user's authority to operate the equipment and the warranty.

NOTE All Carmanah traffic products use a constant-current LED output circuit. Not all traffic beacons are compatible with this output. Please contact Carmanah for additional information and guidance when adding or replacing beacons or other hardware.

NOTE **This guide is specific to the unified Energy Management System (EMS) installation and is not a replacement for the complete E / F / G Series product user manuals.**

Visit support.carmanah.com to download the complete product user manual that is applicable to you.

2.0 Replacement Energy Management System (EMS) Kit

The replacement Energy Management System (EMS) includes:

1. Energy Management System (1); or
2. Energy Management System + mounting cover (1)
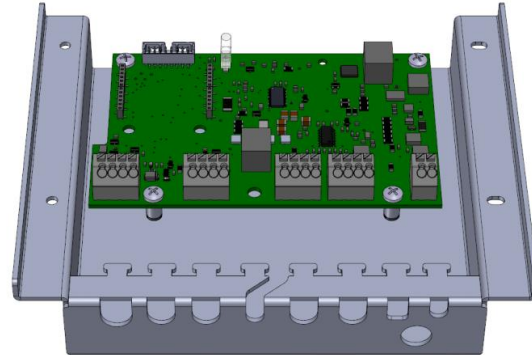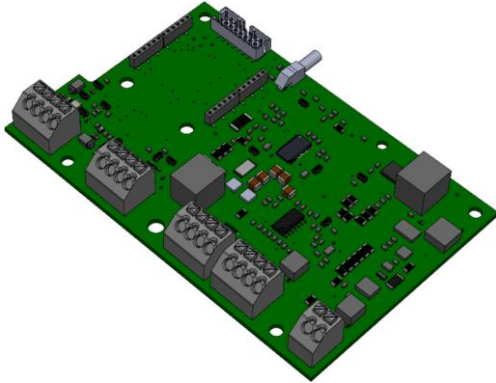
| NOTE | The radio add-on or calendar daughter board add-on will be part of the replacement kit based on your original system requirements. |

| NOTE | For compatibility older legacy R920/R247-E systems will receive an Energy Management System mounted to a new cover. Refer to Section 4.2 for filling out the new serial number label. |

3.0 Tools and Materials Required

The following tools and materials may be required to install the replacement Energy Management System (EMS):

1. #2 Phillips screwdriver
2. Small flat head screwdriver
3. 5/32 security hex bit (SC315 only)
4. Side cutters
5. Electrical tape or wire nuts

4.0 Installation

Refer to the individual product user manual for more details at <u>support.carmanah.com</u>. Depending on your system configuration some connections may not be used. There are also several user adjustable settings that will change the way the system will function. Do not adjust the factory settings unless specified by Carmanah.

The images in this guide may differ from your system. They are for illustrative purposes only.

## 4.1   Removing Existing Energy Management System

1. Remove power to the system. For AC-powered systems, turn off the circuit breaker in the cabinet and for solar-powered systems remove all fuses (battery and solar). For solar-powered systems it may be beneficial to remove the battery or batteries for easier access to the EMS. Ensure the battery terminals do not get shorted during this process.

2. Remove the four screws/washers securing the EMS enclosure and set aside. The image below is for an E Series engine; the F Series engine looks very similar but will be larger. The process is the same for an F Series engine.
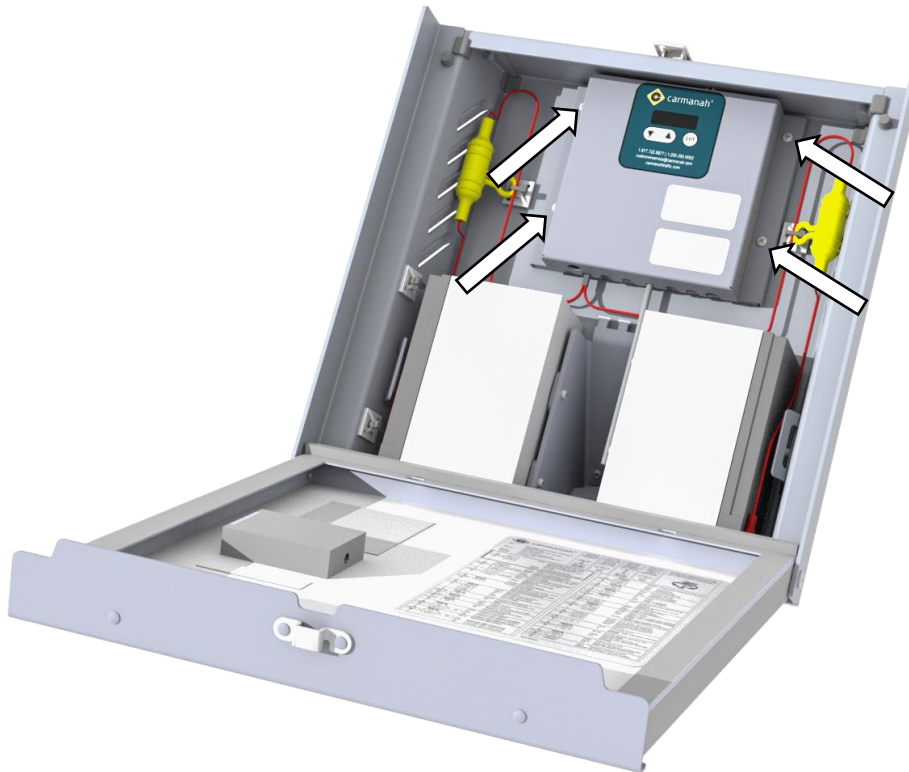
3. For legacy SC315 cabinets you will need to remove the four security screws on the rear of the cabinet. This requires a 5/32" hex security bit. Be careful not to strip the screws. Use forward pressure on the rear of the cabinet and from the inside press against the EMS mounting bracket when loosening the screws.
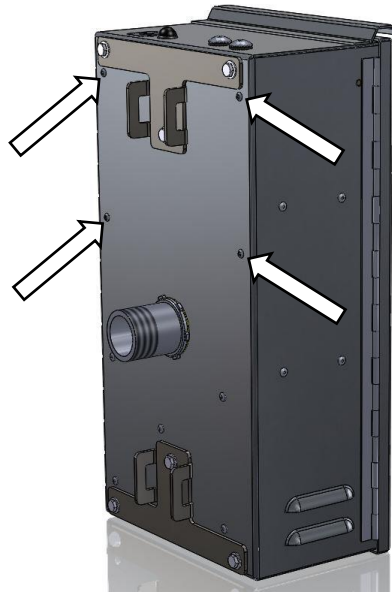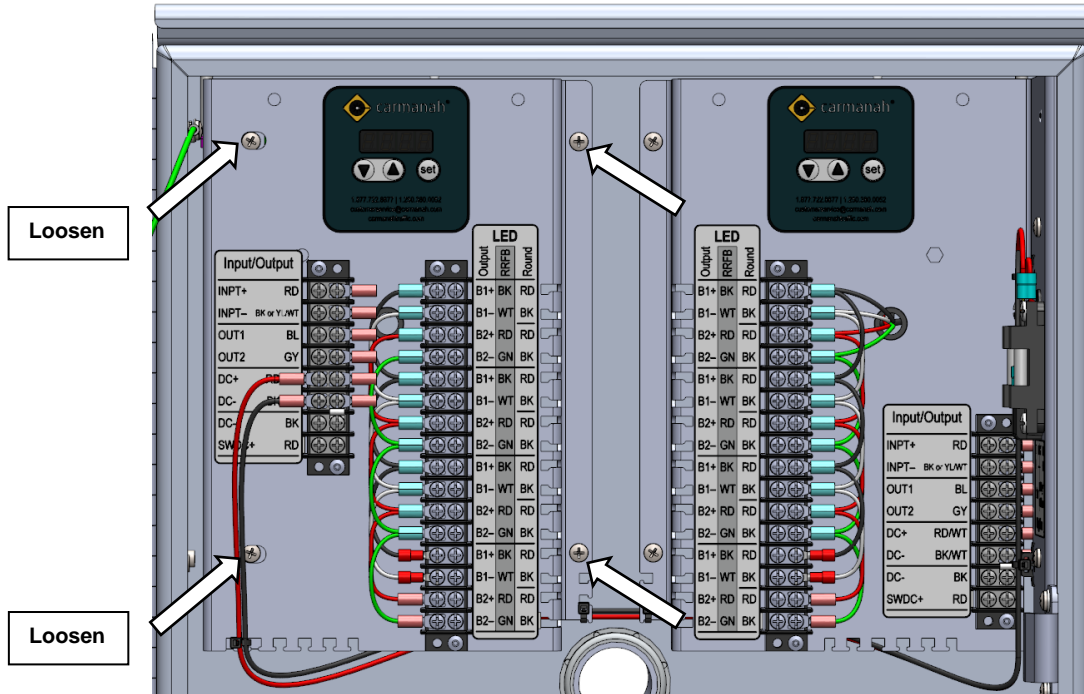

   a. Current G Series cabinets will have four mounting screws on the right-hand side to remove.
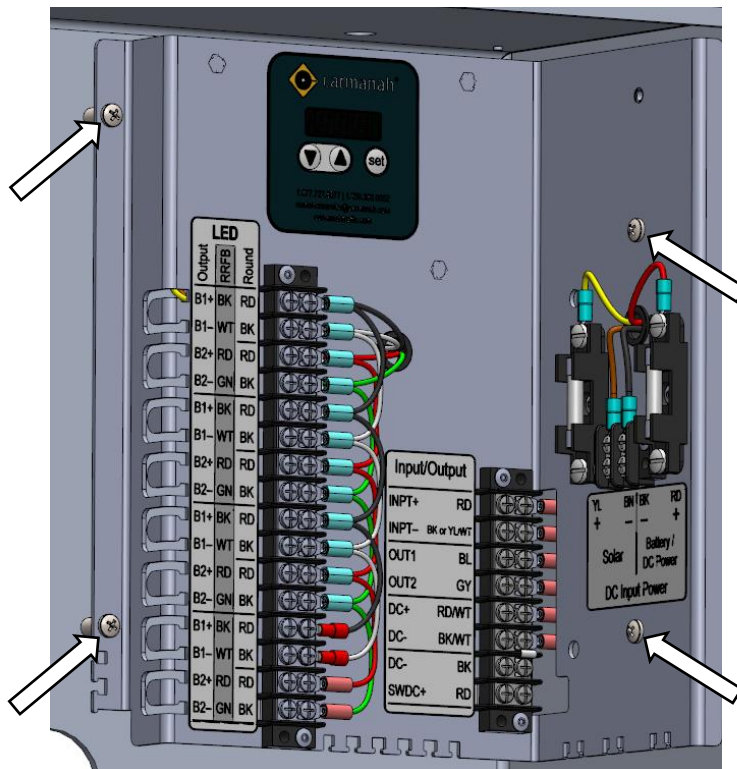
b. Some G Series cabinets may have a dual EMS configuration so there will be one on each side of the cabinet. Simply remove the two inner screws and then loosen the two outer screws.


4. If the optional radio is present carefully remove the radio module from the EMS and then remove the antenna connector with a 5/16" wrench.

   a. Older systems will have radio module cable tied in place which makes it easier to remove the antenna connector without removing the module.

   b. Newer systems will have the radio module secured with two screws.
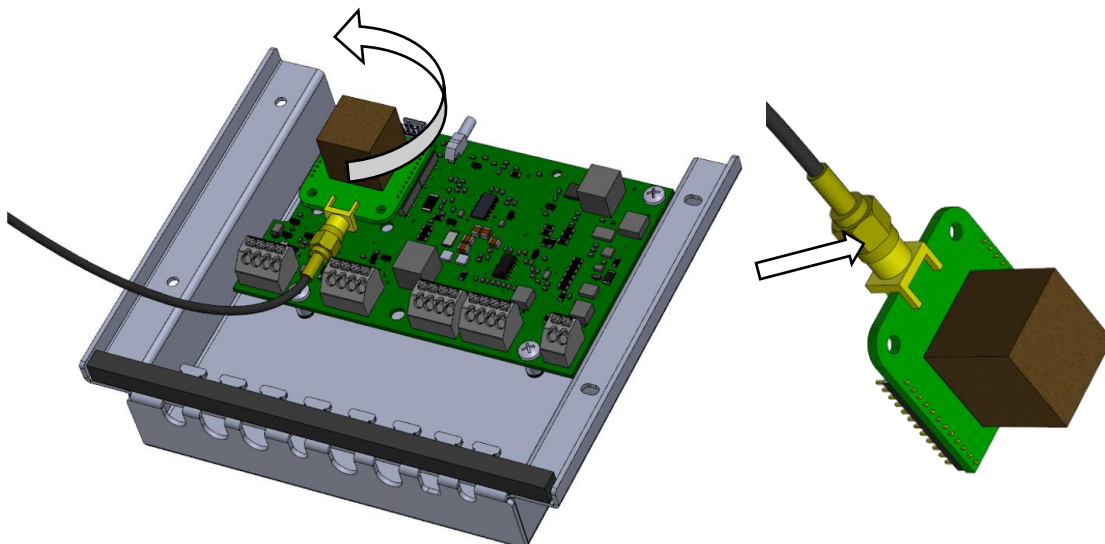
5. Review the existing wiring and take an image as needed for future reference. The wiring layout for this control board is provided in Section 5.

6. Remove all wiring on the control board by lightly pushing down on wire release button with a small flat head screwdriver and pull back on the wires. Remove the solar panel wires last and cap off temporarily with wire nuts or insulation tape. If required, you can cover the solar panel while working on the system for added protection.

Wire release buttons
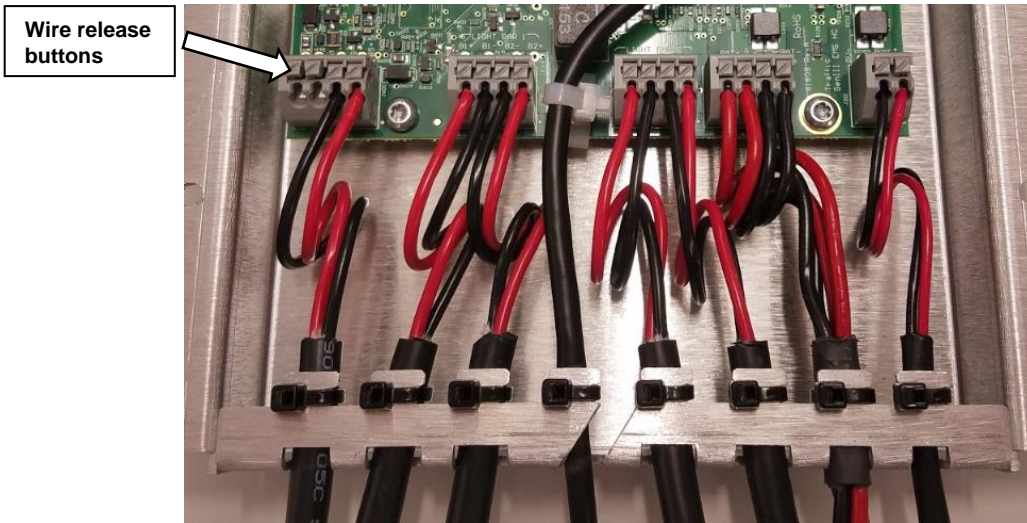
7. Remove the four mounting screws that are securing the EMS to the enclosure and set the EMS aside.
   a. Older systems will have five mounting screws to remove.
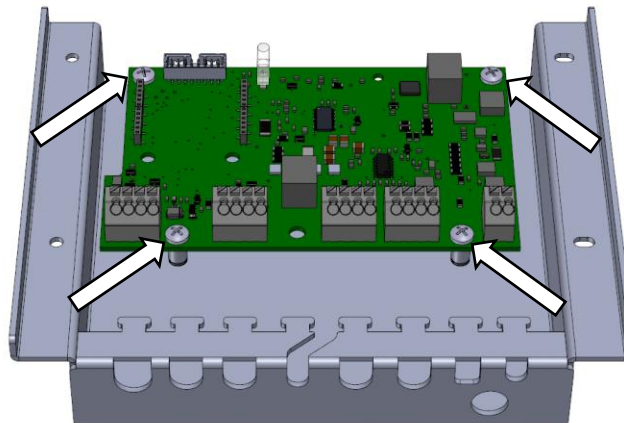
4.2   Installing Replacement Energy Management System

⚠️ **CAUTION** Sensitive electronics can be damaged by electrostatic discharge (ESD). Observe proper ESD precautions when installing the new EMS.

1. Remove the new EMS from its antistatic bag and secure it to the enclosure with the four previously removed screws.
    a. You will receive either a bare EMS or one preassembled to a new enclosure. The new enclosure is for older legacy R920/R247-E systems that originally used a smaller EMS and enclosure footprint.
    b. For replacement controllers that come preassembled to the enclosure you can discard the existing enclosure. Copy over the existing system settings and system serial number (10 digits) onto the new label on the front of the enclosure. This will help retain the original system serial number for future tracking purposes.

> (Record your old system settings key here in permanent marker)
> (eg: SC315G-160-RFB or R920-10-DUAL)
>
> _____
>
> (Record your old system serial number here in permanent marker)
> (eg: 1680000001)
>
> _____
>
> DOM: 20365

2. Beginning with the solar panel wires, check that the wire strands are straight and that all the strands will go into the terminal. This will avoid short circuits.
3. Reconnect all wires with the correct polarity as shown in Section 5. The wire can be pushed directly into the terminal but you may use a small flat head screwdriver to push to down on the wire release button while inserting the wire as needed. Ensure wires are fully inserted. Carefully pull on the wires to ensure they are secure.

4. If the optional radio is present carefully connect the antenna to the new EMS. Push down on the radio module while tightening the antenna connector and ensure it is snug. Secure with the same screws removed as in Section 4.1 if applicable.
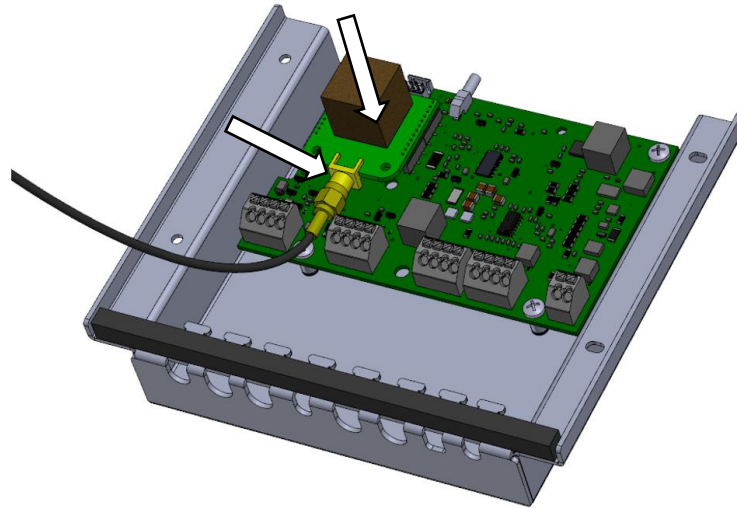

5. Replace any cable ties that were removed to ensure wires have proper strain relief.

6. Secure the EMS enclosure back into the solar engine or cabinet with the four screws/washers removed from Section 4.1.

7. For solar-powered systems, reinstall batteries as required and reconnect all fuses removed from Section 4.1. For AC-powered systems reinstall any fuses that were removed and turn on the breaker.

8. The EMS should now power up and is ready for operation. Normally, the EMS is preconfigured by Carmanah for your specific installation, but the settings can be changed at any time. For crosswalk applications you may need to adjust the crossing duration and radio channel to match the current configuration for your application. Please refer to the specific product manual at support.carmanah.com for more information or contact Carmanah for assistance.

NOTE   For RRFB systems your replacement EMS will come preprogrammed to the 30% night dimming setting (30% of daytime brightness).

5.0 Energy Management System (EMS) Overview
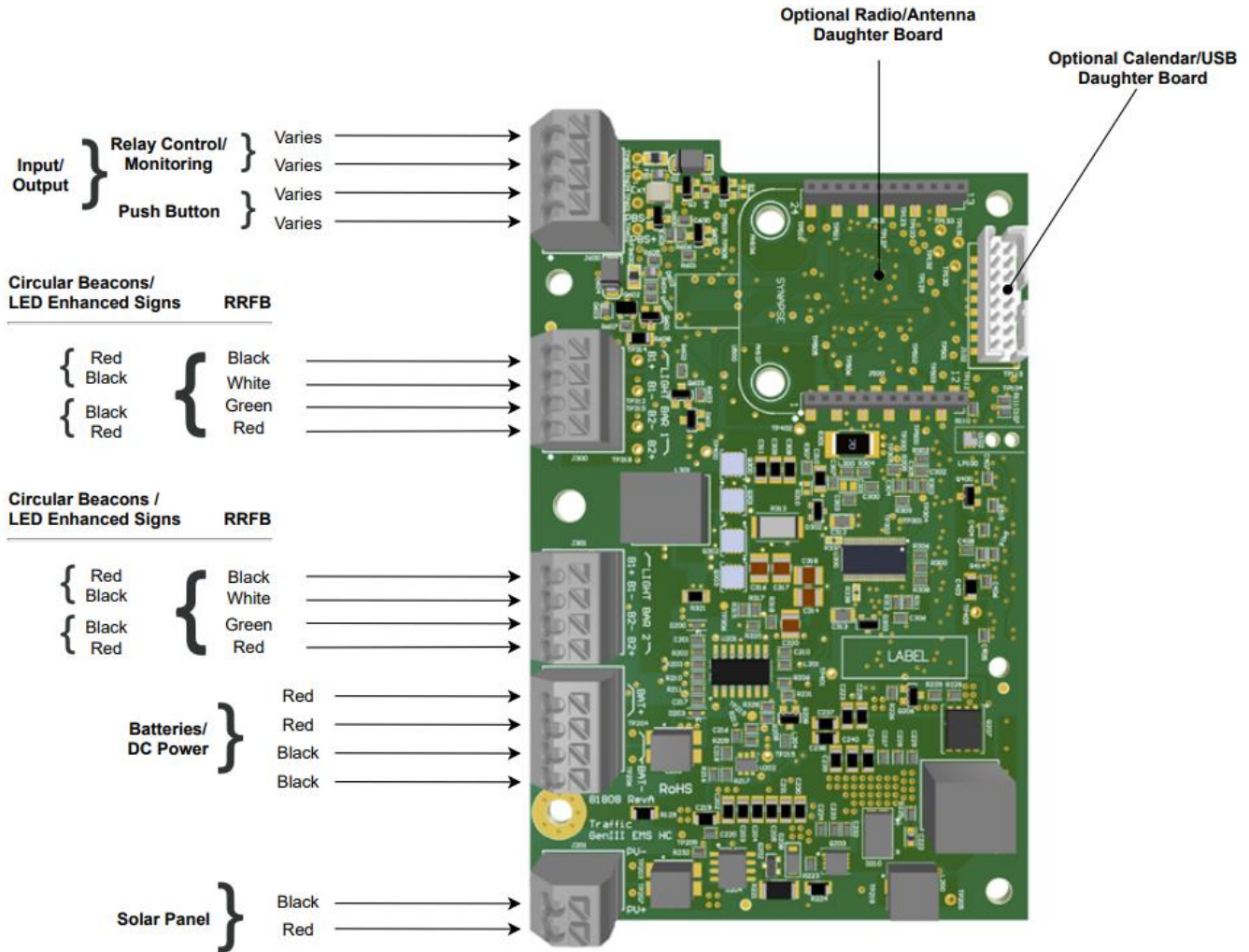
Relay Control/Monitoring:

EXT1 (also labelled as OUT1 on G Series wiring terminal block) – Used for Applied Information time switches only. Pulses of voltage (relative to DC-) indicate the system is operating with no detected fault. This "heartbeat" is used as part of Carmanah's StreetHub system monitoring through the Applied Information time switch.

EXT2 (also labelled as OUT2 on G Series wiring terminal block) – This terminal provides a steady +12 V (nominal, relative to DC-) signal whenever the fixtures are activated and no faults are detected. This digital output is commonly used for triggering a relay to power third party devices or overhead lighting while a fixture is active. It is also used for certain push button applications.

This page left intentionally blank.

This page left intentionally blank.

© 2022 Carmanah Technologies Corporation

Technical Support:
Email: customersupport@carmanah.com
Toll Free: 1.877.722.8877 (US & Canada)
Worldwide: 1.250.380.0052
Fax: 1.250.380.0062
Web: carmanah.com