FLASH TECHNOLOGY

VANGUARD®
FTS 370d, 370w, 370r

LED Medium Intensity Obstruction Lighting System
Reference Manual
Part Number F7913702

SERIAL NUMBER

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FTS 370d/w/r INSTALLATION CHECKLIST

System Controller (SC) 370

☐ The SC 370 is mounted away from radio frequency interference (*RFI*).

☐ The SC 370 is mounted upright.

☐ Lightning protection is grounded to the site grounding system.

- ☐ 2 AWG (*min.*) is used from the SC 370 grounding lug to the site lightning grounding system (*tested for 1ohm or less*).
- ☐ The bend radius for all ground wires is greater than 8" (avoid bending ground wires if possible).

Important! It is recommended that all exposed ground connections are coated with a corrosion inhibitor (NO-OX or equivalent).

☐ There are no holes punched or drilled in the top or sides of the enclosure.

☐ Airflow can properly circulate around the enclosure (*allow 8" min. of unused space on both sides*).

☐ Room allowed for door access (*multi-unit installations*).

☐ The input power (and frequency for AC systems) matches the voltage specified on the unit's data label.

☐ Electrical connections, and inside cabinet hardware mounts have been double-checked for tightness before powering up.

- ☐ All wire connections are installed properly into the terminal blocks (*TB1 and TB2*).
- ☐ ALL PCB connectors are securely plugged into the board (*Phoenix Connectors*).
- ☐ All PCB connector wires are properly inserted and screws are tightened.
- ☐ RS 485 Data cables are installed on PCB1 J4 and routed between System Controllers (*multi-unit installations*).
- ☐ Circuit Breakers are securely fastened to din rail.

☐ The "Binding Procedure" has been performed on each SC 370 installed in the system.
(See Section 3 "Local Tower Config" for special instructions regarding the binding procedure.)

☐ PCB1 Intensity select switch is in the "Auto" position on the System Controller (s).

☐ The SC 370 designated as System 1 is connected to the top flashhead and programmed as AOL.

- ☐ The flashhead cable is connected to TB2, and corresponds to the internal wiring diagram **and color guides on the terminal block**.
- ☐ The flashhead cable is connected to System 1 (If multiple system controllers exist).

Flashhead CABLE

☐ Flashhead cable is **NOT** spliced except at the marker interface enclosure, if installed.

☐ Flashhead individual conductor insulation has not been nicked.

☐ A service loop for the flashhead cable is placed at the base of the tower near the System Controller (*5 feet*).

- ☐ Service loop is attached to the H-Frame or Wall **vertically**.

☐ The flashhead cable is properly secured to the tower so the insulation won't become cut or damaged with wind and time.

- ☐ Using the Flash Technology's two supplied tapes and the 2-3-4 layer method, secure the cable to the tower (*Not exceeding 5' in-between*)
- ☐ A service loop is placed just below the beacon.
- ☐ Service loop is secured at (2) points to the tower structure using the 2-3-4 tape method.
- ☐ The flashhead cable is not pulled tight against sharp edges.
- ☐ 1-3" of space should be between the cable and tower leg flanges or obstructions.

Flashhead

☐The LED beacon is wired correctly.

- ☐ The wires are positioned so no arcing can occur and wire colors match the terminal designations, and flashhead cable is secured in the terminal block.
- ☐ The dome nut of the beacon's cable strain relief is tightened for cable support and to prevent moisture intrusion.
- ☐ Drip loop is present for the LED beacon.
- ☐ The LED beacon is securely closed with both latches in place.
- ☐ The LED beacon at the top of the tower has a lightning rod(s) provided at least 36" above the top of the beacon, and a minimum of 18" away from the beacon.
- ☐ The LED beacon is level (*Use separate leveling tool*).
- ☐ 8 AWG (*min.*) insulated ground wire is used from the LED beacon grounding lug to the tower structure.
- ☐ The LED beacon is mounted in an FAA approved location (*No obstructions; allowing a 360° view of the beacon*).

Marker Interface Junction Box (SC 370d only)

☐ The Marker Interface Enclosure is mounted at the marker tier level.

☐ Flash Technology provided hardware used for mounting the Marker Interface Enclosure (*4 points of contact to Universal Mounting brackets*).

☐ Both latches are secured to prevent water intrusion.

☐ Marker Interface Enclosure is grounded to the tower.

- ☐ 8 AWG (*min.*) insulated ground wire is used from the Marker Interface Enclosure grounding lug to the tower structure.

☐ Side marker cable connections match all PCB labels (**Connections are polarity sensitive, *correct wiring is critical***).

☐ Service loop for the flashhead cable to the ground is present near the base of the Marker Interface Enclosure.

☐ Service loop for the flashhead cable to the flashhead is present near the base of the Marker Interface Enclosure.

MARKERS (*Steady-burning Red LED sidelights, side-markers, or obstruction lights L-810*)

- ☐ Only Flash Technology provided **24 Volt DC Marker Fixtures** are installed.
- ☐ The dome nuts of the cable strain reliefs are tightened for cable support and to prevent moisture intrusion.

PHOTODIODE (PHD 516)

☐ The PHD 516 is connected to PCB2 (*Surge Board*) P-6 (*White, Black, and Drain wires correspond to the label on board*).

☐ The PHD 516 is mounted vertically to prevent water entry.

☐ The PHD 516 cable is protected through conduit so it will not be stepped on or damaged.

☐ The PHD 516 is facing north and no artificial lights (*security lights, street lights, lighted signs, or direct sunlight*) will affect its operation.

ALARMS and ALARM WIRING

☐ **NO** alarm LEDs are lit on PCB1 of the SC 370.

☐ The display located on PCB1 of the SC 370 is showing "Status OK" along with the correct configuration of the system type installed (*Dual or White with the correct number of beacons, and markers if applicable*).

☐ A Lighting Inspection has been performed via the User Interface Panel.

Call 1-800-821-5825 if additional TECHNICAL or INSTALLATION assistance is needed.

Front Matter

Abstract

This manual contains information and instructions for installing, operating and maintaining the FTS 370d, 370w and 370r LED Medium Intensity Obstruction Lighting Systems with the following input voltages: 120-240V AC, 24V DC and 48V DC. All model variants support optional IR (infrared) output.

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Trademark Acknowledgements

Flash Technology and Vanguard are registered trademarks of SPX Corporation.

All other trademarks and product names mentioned are properties of their respective companies, and are recognized and acknowledged as such by Flash Technology.

Applicable Specifications

This equipment meets or exceeds requirements for the following FAA Types: L-864/865, L-865, L-866/885, L-866 and L-885.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Patent Information

FH 370, described within this document, is covered by the following patent: Patent No. 8,926,148
MKR 371, described within this document is, covered by the following patent: Patent No. 8.998.443
Additional patents pending.

Disclaimer

While every effort has been made to ensure that the information in this manual is complete, accurate and up-to-date, Flash Technology assumes no liability for damages resulting from any errors or omissions in this manual, or from the use of the information contained herein. Flash Technology reserves the right to revise this manual without obligation to notify any person or organization of the revision.

In no event will Flash Technology be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of or the inability to use this manual.

Warranty

With proper installation and with normal operating conditions, Flash Technology warrants all lighting components of the LED lighting system for 5 years from the date of shipment from Flash Technology. Monitoring components such as modem or battery, if present, are only covered by 1–2 years warranty from the date of shipment.

Parts Replacement

The use of parts or components, in this equipment, not manufactured or supplied by Flash Technology voids the warranty and invalidates the third party testing laboratory certification which ensures compliance with FAA Advisory Circulars 150/5345-43H, 150/5345-53D, and Engineering Brief No. 67D. The certification is valid as long as the system is maintained in accordance with FAA guidelines (FR doc. 04-13718 filed 6-16-04).

Personnel Hazard Warning

Dangerous Voltages

Dangerous line voltages reside in certain locations in this equipment. Also, this equipment may generate dangerous voltages. Although Flash Technology has incorporated every practical safety precaution, exercise extreme caution at all times when you expose circuits and components, and when you operate, maintain, or service this equipment.

Avoid Touching Live Circuits

Avoid touching any component or any part of the circuitry while the equipment is operating. Do not change components or make adjustments inside the equipment with power on.

Dangerous Voltages Can Persist with Power Disconnected

Under certain conditions, dangerous voltages can be present because capacitors can retain charges even after the power has been disconnected.

Protect yourself — always turn off the input (primary) power and wait for storage capacitors to drain their charge. Then check the system controller's TB2 output terminals with a voltmeter for any residual charge before touching any circuit element or component.

Do Not Depend on Interlocks

Never depend on interlocks alone to remove unsafe voltages. Always check circuits with a voltmeter. Under no circumstances remove or alter any safety interlock switch.

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Section 1 – Introduction and Operation

Introduction

FTS 370d and FTS 370w are LED Medium Intensity Obstruction Lighting Systems. FTS 370d series are Dual Lighting Systems (red/white) for L-864/865 applications. FTS 370w series are White Lighting Systems for L-865 applications.

FTS 370 series lighting systems may also be configured for Catenary operation. Catenary lighting systems require three levels (tiers) of lights. One tier is installed at each of the following three locations: top of the structure, lowest point of the catenary and half way between the upper and lower levels. Each level must be lit to provide 360-degree coverage. The flash rate is 60 flashes per minute in all modes and the flash sequence is as follows: middle – top – bottom.

FTS 370d Catenary series are Dual Lighting Systems for L-866/885 applications. FTS 370w Catenary series are White Lighting Systems for L-866 applications. FTS 370r series are Red Lighting Systems for L-885 Catenary applications only.

System Overview

The FTS 370d, FTS 370w and FTS 370r LED Lighting Systems have been designed for long life, reducing the need for service. Ease of installation and service is enhanced by simple wiring, setup, and diagnostics. Increased safety is provided with operating voltages of less than 60VDC.

Each Lighting System consists of one or more SC 370d, SC 370w or SC 370r, here after referred to as SC 370, power and control unit(s) and its associated flashhead. Each flashhead requires its own SC 370. A maximum of **six (6)** SC 370s and associated flashheads may be connected to form one lighting system. Optional GPS synchronization is available if additional SC 370s are required.

The light source for the flashhead is comprised of LEDs (Light Emitting Diodes). The LED control circuitry and drivers are located in the flashhead. Power Line Communication is utilized as the communication link between the SC 370 and the flashhead; simplifying installation and minimizing the number of conductors required. Installation of FTS 370d systems (L-864/865) requiring L-810 markers is simplified by requiring only one cable run for both markers and flashhead. The flashhead may be located up to 850’ (cable length) from the controller.

Any SC 370 in the lighting system may be configured as the control unit which is referred to as System 1. This unit provides overall system control including mode control, synchronization, and alarm collection and notification. Robust and highly reliable communication between multiple SC 370 units is provided by RS-485.

SC 370 systems may be ordered configured for operation by AC or DC input power. AC systems are not sensitive to input power phase and have an operational voltage range of 120-240 VAC, 50/60 Hz with no modification necessary to the input power module. DC powered systems are available configured for 24 or 48 VDC. The DC input voltage must be specified when ordering.

This manual provides guidance and recommendations for the installation, operation, and troubleshooting of the lighting system. Please read this document in its entirety before installation.

Specifications

Table 1-1 – Physical Specifications

Equipment Model	**Physical Specifications**
SC 370 System Controller (Standard): Dimensions H x W x D (millimeters) Weight (kilograms)	 23.82 x 17.25 x 8.51 in (605 x 438.3 x 216.2) 39 lb (18.1)
SC 370 System Controller (Stainless Option): Dimensions H x W x D (millimeters) Weight (kilograms)	 23.00 x 17.13 x 6.44 in (584.2 x 435.1 x 163.6) 40 lb (18.1)
Marker Interface (Standard): Dimensions H x W x D (millimeters) Weight (kilograms)	 16.1 x 10.5 x 4.91 in (408.9 x 266.7 x 124.8) 10.1 lb (4.6)
Marker Interface (Stainless Option): Dimensions H x W x D (millimeters) Weight (kilograms)	 13.75 x 11.05 x 4.36 in (349.3 x 280.7 x 110.7) 11.7 lb (5.3)
FH 370 Flashhead: Dimensions H x D (millimeters) Weight (kilograms) Aerodynamic Wind Area (cm^2)	 7.5 x 15.75 in (190.5 x 400) 26.3 lb (11.9) 99.13 in^2 (639.5)
MKR 371: Dimensions H x W x D (millimeters) Weight (kilograms)	 9.0 x 2.75 x 2.13 in (228.6 x 69.9 x 54.1) 1.6 lb (0.7)
PHD 516 Photodiode: Dimensions H x W x D (millimeters)	 4.27 x 2.02 x 1.31 in (108.4 x 51.3 x 33.3)

Table 1-2 – Performance Specifications

Parameter	**FAA Lighting Type**	
	L-864 and L-865	L-866 and L-885
Flash Intensity (nominal): Day (White) Night (Red) Night (White), White Backup	 20,000 ± 25% ECD 2,000 ± 25% ECD 2,000 ± 25% ECD	 20,000 ± 25% ECD 2,000 ± 25% ECD 2,000 ± 25% ECD
Flash Rate: Day (White) Night (Red) Night (White), White backup	 40 flashes per min. 20/30/40 flashes per min. 40 flashes per min.	 60 flashes per min. 60 flashes per min. 60 flashes per min.
Primary Power	120V - 240V AC, 50/60 Hz (3A - 1.5A Peak) +/- 24 V DC (20–30 V) (16A Peak) +/- 48 V DC (40-60 V) (8A Peak)	
Power Consumption (±5%): Day (White) Night (Red) Night (White) / White Backup	FTS 370 / FTS 370 IR 80 W 70 W 40 W 40 W 40 W 40 W	FTS 370 / FTS 370 IR 110 W 100 W 50 W 50 W 50 W 50 W
Environmental	Complies with FAA specifications in AC 150/5345-43H for continuous operation which includes the following: **Temperature:** Storage/shipping: -67° to 130° Fahrenheit (F) -55° to 55° Celsius (C) Operating: -40° to 130° F -40° to 55° C **Humidity**: 95 percent relative humidity.	
Flashhead cable length	6-375 ft. PN 4210000, 10 AWG 6-600 ft. PN 4370000, 8 AWG 6-850 ft. PN 4206000, 6 AWG	

Operation Overview

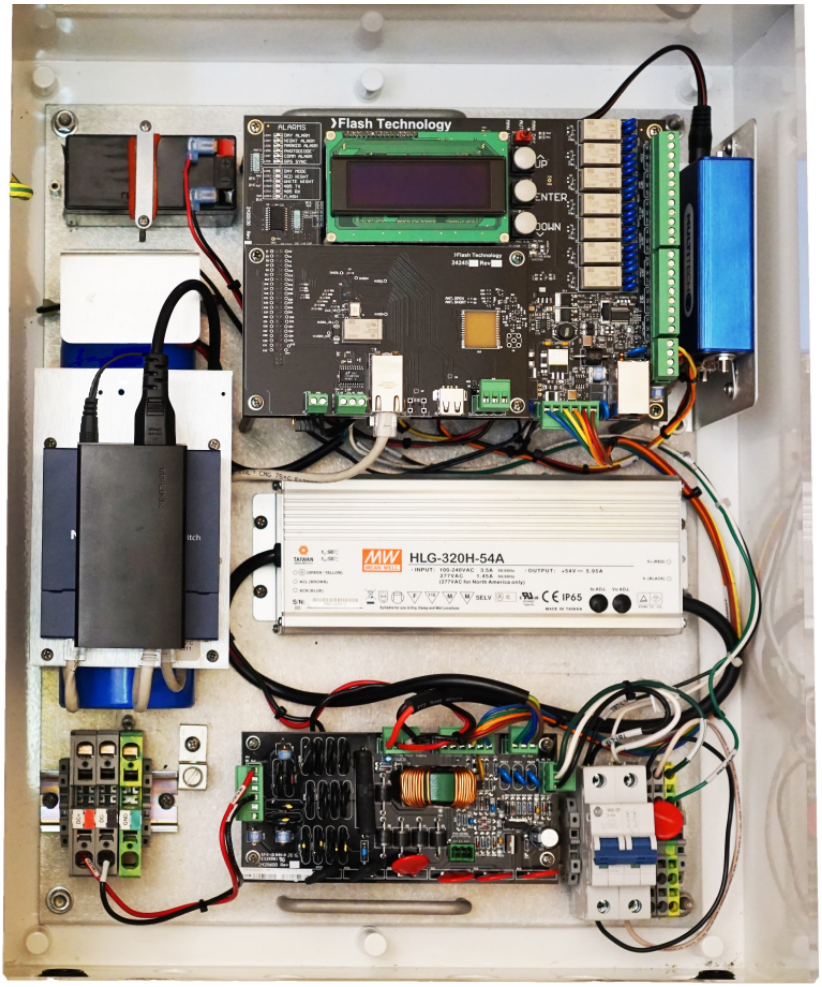
An internal view of the SC 370 is shown in Figure 1-1. Component layout diagrams with part names and numbers are shown in Figures 6-1 (AC) and 6-2 (DC). Internal wiring diagrams are shown in Figures 2-24 – 2-28 (AC) and 2-29 – 2-31 (DC).

Input power is connected to terminal block TB1. Mounted on TB1 is a Metal Oxide Varistor (VR1) which reduces line surges and transients. Input power Circuit Breakers are also mounted on TB1. Disconnect power from the SC 370 before servicing Circuit Breakers or MOV.

Flag Indicator on the 2-pole Circuit Breakers is clearly marked with green OFF and red ON.

The power supplies located in each SC 370 unit convert input power to the correct DC operating voltages for the system. (Shown with single power supply below).

The control PCB (PCB1) supervises system operation. A User Interface with alphanumeric display and pushbuttons provides system configuration and alarm notification.



Note: Shown with Modem and Wi-Fi options.

Figure 1-1 – SC 370 (AC)

PCB1 Controller Board

PCB1 controls and monitors operation of the SC 370 and its associated flashhead. Each section of PCB1, outlined in the photo below, is discussed in the following subheadings.

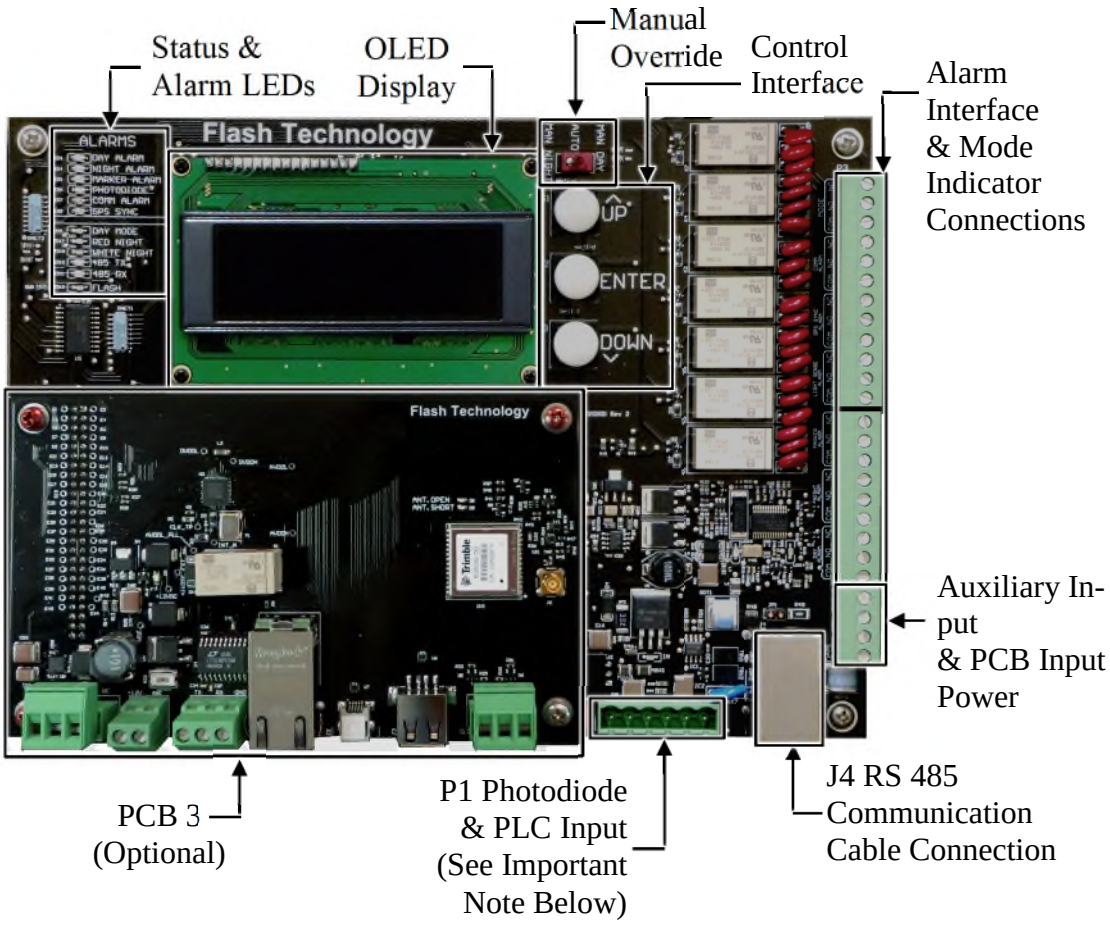


Figure 1-2 – PCB1 Controller Board

Important! Do not install or remove wires from terminal blocks or PCB's until DC voltage indicator on PCB2 has been extinguished. This applies especially to connection at PCB1 P1. If it is necessary to remove connection or make other wiring adjustments, power the system down and wait until the LED on PCB2 is off.

PCB1 P1

PCB1 Information Display and User Interface

A multi-line OLED (Organic Light-Emitting Diode) display provides system status, alarm and programming information. Three pushbuttons located to the immediate right of the display provide the user interface for the system. The top and bottom buttons move the cursor position (*) up and down on the display. The center button selects the action at the cursor position. The information display defaults to show the current system status as well as the basic configuration for the unit. See Section 3 for a detailed description for all menu functions of the information display. See Table 3-3 for a complete list of alarms provided by the information display.

Figure 1-3 – Information Display and User Interface

Manual Override

The Manual Mode switch provides temporary control of the system's operating mode. When the manual mode switch of the unit is moved to either MAN DAY or MAN NIGHT, the display reads "M-DAY" or "M-NIGHT" respectively and the corresponding Mode LED blinks. Manual mode expires 30 minutes after initiating the mode override. Each change to the manual mode switch restarts the 30 minute timer. The Manual Mode switch must be moved after power up to activate mode override. The switch has no effect if it is set to Day or Night before power up.

Status and Alarm LEDs

Twelve Status and Alarm LEDs are provided for immediate visual reference of the current status of the unit. Table 1-3 describes the function of each LED.

Table 1-3 – Status & Alarm LEDs

LED	Indication
DAY ALARM	Red to indicate one or more of the following conditions: 1. The connected beacon is experiencing a failure in Day mode. 2. The beacon is not communicating with the SC 370. The Day Alarm will be accompanied by the Night Alarm and the Comm. Alarm in this instance.
NIGHT ALARM	Red to indicate one or more of the following conditions: 1. The connected beacon is experiencing a failure in Night mode. 2. The beacon is not communicating with the SC 370. The Night Alarm will be accompanied by the Day Alarm and the Comm. Alarm in this instance. 3. Beacon IR failure. Activation of Night Alarm due to IR failure requires that “IR Enable” and “IR Alarm Is Night Alarm” are set to “Yes”. See Section 3 “Site Tower Config.” for additional information.
MARKER ALARM	Red to indicate one or more of the following conditions: 1. One or more L-810 markers have failed.(FTS 370d L-864/865 only) 2. The marker interface board is not communicating with the SC 370 *. * The Marker Alarm will be accompanied by the Comm. Alarm in this instance.
PHOTODIODE	Red when more than 19 hours have passed since the system has changed modes via the photodiode input.
COMM ALARM	Red to indicate a communications failure in one or more of the following conditions: 1. One or more connected units (Systems 2 – 6) are not communicating with System 1. 2. The connected beacon is not communicating with the SC 370. The Comm. Alarm will be accompanied by the Day Alarm and Night Alarm. 3. The connected marker tier is not communicating with the SC 370. The Comm. Alarm will be accompanied by the Marker Alarm.
GPS SYNC	More than one hour has passed since the unit received a GPS Sync. pulse.
DAY MODE	Green continuous when unit is in DAY mode, blinking when the unit is in manual DAY mode.
RED NIGHT	Green continuous when unit is in RED NIGHT mode, blinking when the unit is in manual RED NIGHT mode.
WHITE NIGHT	Green continuous when unit is in WHITE NIGHT mode, blinking when the unit is in manual WHITE NIGHT mode.
485 TX	Red blinking when the unit is sending data to other units in the system.
485 RX	Red blinking when the unit is receiving data from other units in the system.
FLASH	Active only if GPS is enabled. Blinks approximately once per minute when SAT lock is achieved.

Note: See Table 3-3 for a complete list of alarms provided by the information display.

Table 1-4 – Multitech Modem LEDs

LED	**Indication**	
POWER	On Solid: The modem is properly powered	
STATUS	On Solid: Modem is starting up or saving its configuration. Blinking: Modem initialization is complete and ready for use	
CD	On Solid: A data connection has been established. ON during normal operation	
LS	ATT Modem: On Solid: Not registered on the network Slow Blinking: Registered and connected to the network	Verizon Modem: Fast Blinking: Not registered on the network or is searching for connection Slow Blinking: Registered and connected to the network On Solid: Modem is transmitting or receiving
SIGNAL	1 Bar: Very weak signal 2 Bars: Weak Signal 3 Bars: Good Signal	

Alarm Interface & Mode Indicator Connections

Dry contact alarm connections, located on PCB 1, are available regardless of any additional monitoring method used. The available dry contact alarm outputs are listed in Table 1-5 and shown in Figure 1-4. Each contact may be wired as normally open or normally closed. The contacts are labeled to indicate their state with the system powered on without an alarm present.

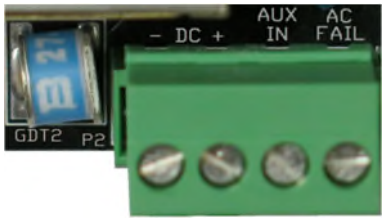
Mode indicator contacts are available on P4 terminals 10 – 12. When powered on, an open contact between COM and NO indicates the system is operating in Night mode and a closed contact indicates the system is operating in Day mode. An open contact between COM and NC indicates the system is operating in Day mode and a closed contact indicates the system is operating in Night mode. The mode indicator contacts do not differentiate between manual and automatic operation as determined by the Manual Mode Switch.

Figure 1-4 – Alarm Interface & Mode Indicator Connections

Table 1-5 – Alarm Interface & Mode Indicator Connections

Connector	Alarm	Terminal	Function
P3	Day Alarm	COM (1) NO (2) NC (3)	Common Closes to indicate an alarm in day mode. Opens to indicate an alarm in day mode.
P3	Night Alarm	COM (4) NO (5) NC (6)	Common Closes to indicate an alarm in night mode. Opens to indicate an alarm in night mode.
P3	Marker Alarm	COM (7) NO (8) NC (9)	Common Closes to indicate a marker alarm. Opens to indicate a marker alarm.
P4	Photo-Diode Alarm	COM (1) NO (2) NC (3)	Common Closes to indicate a photodiode alarm. Opens to indicate a photodiode alarm.
P4	GPS Sync. Alarm	COM (4) NO (5) NC (6)	Common Closes to indicate a Sync Alarm. Opens to indicate a Sync Alarm.
P4	Comm. Alarm	COM (7) NO (8) NC (9)	Common Closes to indicate a Comm. failure. Opens to indicate a Comm. failure.
P4	Mode	COM (10) NO (11) NC (12)	Common Open indicates Night mode. Closed indicates Day mode. Open indicates Day mode. Closed indicates Night mode.

P2 Auxiliary Input



The Auxiliary Input (previously labeled LOW BAT) allows an external device, such as a radar system, to inhibit the output of the beacon. **Control via the Auxiliary Input is limited to systems consisting of a single SC 370 power and control unit.** Control is supplied by a dry contact from the external device connected to "Aux In" (P2 terminal 3) and "DC –" (P2 terminal 1). The fail-safe design requires a closed contact to inhibit the output of the beacon.

Any unused dry contact may be reassigned to provide confirmation that the system is operating normally while the beacon output is inhibited. See Figure 1-4 and Table 1-5 for available dry contacts.

Auxiliary Input configuration programming is located in the "Site Tower Configuration" menu of the controller programmed as System 1. See Section 3 for additional information regarding this feature.

Note: Firmware 2.9 or above is required for Auxiliary Input Control. The beacon output may also be controlled by Modbus. See Section 3 and Technical Bulletin "SC 370 SMART Modbus interface" (part number 7904502) for additional information.

J4 Communication Cable Connection

FTS 370 systems consisting of more than one SC 370 unit require connection of a communication cable between units. J4, located on the lower right of PCB1, provides connection for two RJ 45 connectors. The double RJ 45 connector allows the communication cables to be daisy chained from System 1 to each subordinate unit. Either port may be utilized as an input to or output from PCB 1. See "Communication Cable Kit" in Section 2 for additional connection and cable routing information.

PCB3 Smart Board

The optional PCB3 "Smart Board" (PN 2424500) is installed on top of PCB1 of the SC 370 programmed as System 1. It provides an interface to the following advanced monitoring capabilities not available on the standard system: Cellular Eagle 2.0, RS 485 Modbus RTU, Ethernet SNMP, Ethernet Eagle 2.0 and Ethernet Modbus. The GPS enabled Smart Board (PN 2424501), shown in Figure 1-5, provides the same capabilities as the standard Smart Board with the addition of GPS synchronization. Either Smart Board is required for the optional cellular modem and/or Wi-Fi interface. **The GPS enabled Smart Board is strongly recommended for Catenary systems**.

GPS Sync. Kit

The FTS 370 system can be ordered with GPS Synchronization factory installed. It is also available as an upgrade for existing FTS 370 systems. The kit (PN 1370185) includes instructions and all components necessary for installation. Antenna installation instructions are provided in Section 2 "GPS Antenna" for systems ordered with GPS Sync factory installed.

Two LEDs: Antenna Open and Antenna Short, provide status of the GPS antenna. The Ant. Open will be lit if the GPS antenna is not connected or is not properly connected to the antenna connector. It will also indicate a broken or damaged wire to the antenna. The Ant. Short will be lit if the antenna cable is shorted. Neither LED should be lit in if the antenna is functioning correctly.

USB Port

The USB port provides access to update the system's firmware and to interface with an optional USB Wi-Fi adaptor. See Section 3 USB Firmware Update for additional information regarding this feature.

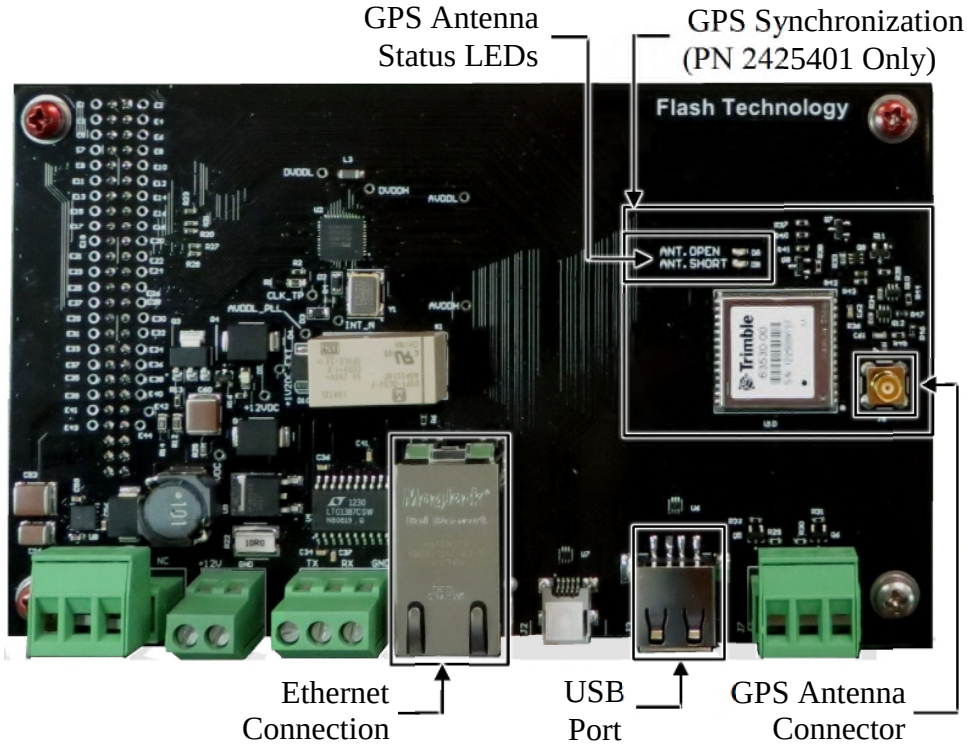


Figure 1-5 – PCB 3 with GPS

PCB2 Surge Board

The PCB2 “Surge Board” (AC PN 2420600, DC PN 2420601) is installed in the bottom of the SC 370. PCB2 has multistage surge protection which provides protection to the controller from negative and positive strikes.

The surge board shown in Figure 1-6 has a Power LED. The LED will illuminate indicating the system is operating with full DC Voltage output (60VDC). Once AC power is removed from the system the LED will turn off after approx. 5-10 seconds to indicate a full voltage discharge. It is important to verify the output voltage is fully depleted before replacing any circuit boards or re-terminating any wires inside the system controller as damage could occur if voltage is still present.

The Photodiode connection is at connector P6 on the PCB2 surge board. This connection is polarity sensitive, so it is critical to verify wiring is as shown in Figures 2-24 to 2-31. The board also has screen printed labels in white text to assist with installation.

If a replacement is necessary complete the following steps:

1. Remove AC power by turning off the breaker.

2. Verify TB2 voltage is below 5VDC.

3. Remove all green Phoenix connectors.

4. Remove the (4) mounting screws on the outer corners of the board.

5. Install the replacement in reverse order.

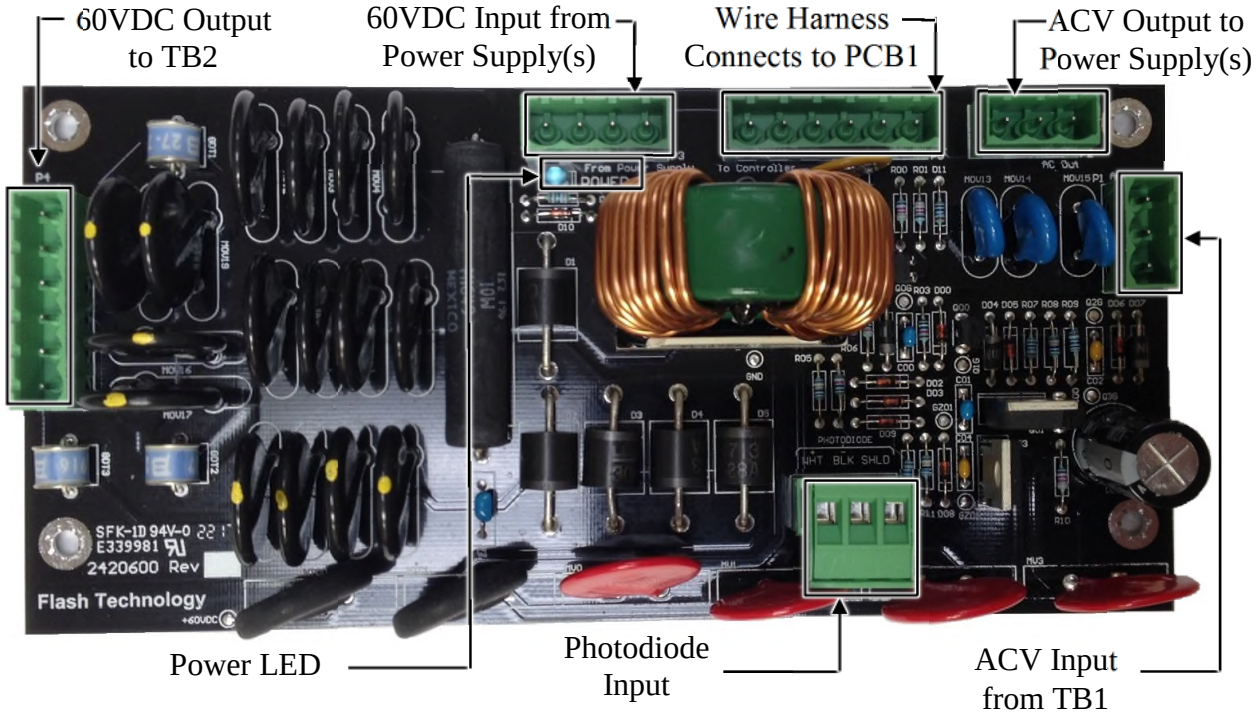


Figure 1-6 – PCB2 Surge Board (PN 2420600 or 2420601)
(This is a direct replacement for PN 2420500 or PN 2420501)

FH 370d/w/r

FH 370d/w/r, shown in Figure 1-7, is divided into two sections: light engine, and base assembly. The light engine is comprised of highly efficient LEDs which are focused by Fresnel optics to produce the required output per FAA specifications for the following types: L-864/865 (dual), L865 (white), L-866/885 (dual Catenary), L-885 (white Catenary) or L-866 (red Catenary) beacons.[1] In the event service is required, the light engine is field replaceable as a single assembly. The base assembly contains a terminal block for connection of the flashhead cable and a surge protection PCB that is placed in line between the output of the terminal block and input to the light engine.

FH 370d IR[1] (Infrared) is visually identical to Figure 1-7. It incorporates all features of the FH 370d and adds 12 infrared LEDs. The addition of IR ensures visibility of the obstruction to pilots aided by NVG (night vision goggles). The combination of standard Red (620nm) LEDs and IR (850nm) LEDs ensures maximum visibility to pilots in all circumstances.

1. The application type must be specified when ordering a flashhead or replacement light engine.

Figure 1-7 – FH 370d/w/r

Marker Interface Enclosure

(SC 370d - L-864/865 only)

Operation Overview

The Marker Interface Enclosure mounting diagram is shown in Figure 2-15 (Stainless Steel option shown in Figure 2-16) and the wiring diagram is shown in Figure 2-32.

Operational power for the Marker Interface PCB and connected L-810 markers is supplied by the flashhead cable. TB1, located in the marker interface enclosure, provides a splice point for the flashhead cable which then continues to its termination point at the flashhead. Marker connections are provided at terminals J1 – J4 located on the Marker Interface PCB.

Marker programming, control and status are accessed through the User Interface located on PCB 1 of the SC 370d. Power Line Communication over the flashhead cable is utilized as the communications link between the SC 370d and the Marker Interface PCB. LEDs located on the Marker Interface PCB provide operational status during service.

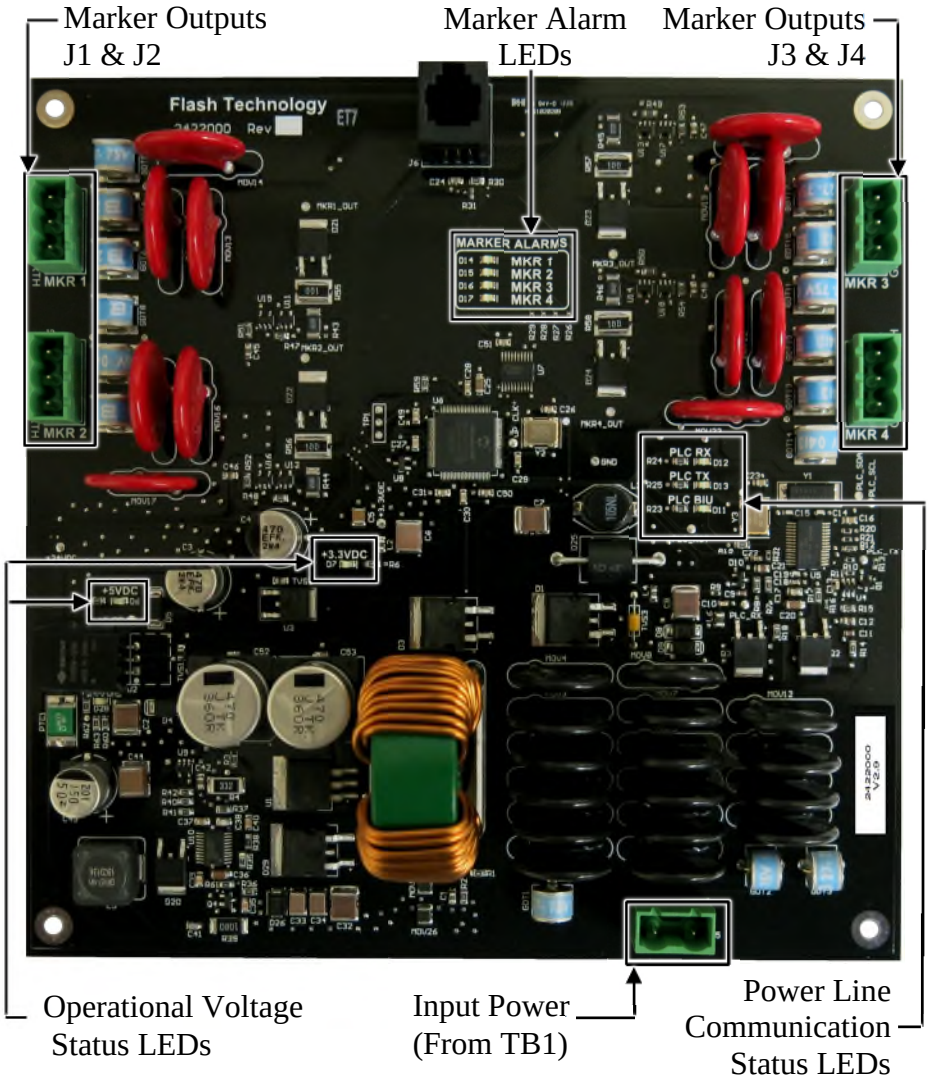


Figure 1-8 – Marker Interface PCB

MKR 371

(SC 370d L-864/865 only)

MKR 371 DC, shown in Figure 1-9, is a 24V DC LED L-810 marker. The innovative design combines three highly efficient LED's and Fresnel optics into a compact cast aluminum base which is easy to install; requiring minimal hardware.

MKR 371 DC IR (Infrared), which is visually identical to MKR 371 DC, adds three IR LEDs. The addition of IR ensures visibility of the obstruction to pilots aided by NVG. The combination of standard Red (620nm) LEDs and IR (850nm) LEDs ensures maximum visibility to pilots in all circumstances.

Operational power is supplied by the Marker Interface Enclosure discussed in the previous heading. A mounting diagram for the MKR 371 is provided in Figure 2-14. Complete installation diagrams and instructions are provided with the marker kit.

Note: Refer to "Vanguard® Marker Installation" (Part # 7904214) for specific information regarding cable connection to the MKR 371.

Figure 1-9 – MKR 371

Section 2 – Mounting and Installation

Unpacking

Inspect shipping cartons for signs of damage before opening. Check package contents against the packing list and inspect each item for visible damage. Report damage claims promptly to the freight handler.

Note: Record equipment serial numbers for future reference.

Recommended Tools

Flash Technology recommends the following tools for installation and maintenance:

- Single Beacon Installation kit. (Part # F1370990)
- 1/8" non-flared flat blade screw driver
- 9 or 12 inch, flat blade #2 screwdriver
- #2 Phillips® head screwdriver
- Set of combination wrenches
- Assorted nut driver handles: 1/4", 5/16", 3/8" recommended
- Long-nose pliers
- Wire Strippers
- Digital volt-ohm meter
- Level
- Cable Ties
- Tin Snips
- Camera (for documentation)

Controller Installation

WARNING!

Read the warning on Page ii now. Disconnect primary power before opening enclosures.

Verify the Installation

Upon completion of the system installation, verify that the Information Display, located on PCB1, shows the correct configuration for System 1 and each subordinate unit installed in the system. See Section 3 for a detailed description of the menu and all functions of the information display.

SC 370 Access

The cover is hinged and secured with knobs that rotate (clockwise) to latch. Rotate the knobs counterclockwise and swing the cover open for internal access.

Note: The stainless steel enclosure is secured with latches.

Mounting

The SC370 enclosure mounting outline and dimensions are shown in Figure 2-9 (Stainless Steel option shown in Figure 2-10). Mounting hardware is not provided unless it is ordered as part of an installation kit. Use the following guidelines for mounting the SC 370:

- Ensure that adequate space exists around the equipment for access during installation, maintenance and servicing.
- Allow space for airflow around the controller (approximately 8" separation between enclosures).

Mounting Adapter Panel (Optional)

The optional Mounting Adapter Panel, shown in Figure 2-11, allows for easier installation of the FTS 370d/w/r system by removing the need for modifying the existing outdoor H-Frame when upgrading from previously installed Flash Technology products. The H-Frame may require adjustment when upgrading from non-Flash Technology lighting products if the adapter panels are requested. Please contact the Flash Technology parts department at 1-800-821-5825 if this option is desired.

Wiring

Typical E1/D1 & E2/D2 component location diagrams are shown in Figures 2-17 and 2-18. A D1/D2 system wiring diagram is shown in Figure 2-21 and an E1/E2 wiring diagram is shown in Figure 2-22. A typical Catenary component location diagram is shown in Figure 2-20 with a wiring diagram shown in Figure 2-23. Installation notes for system types shown in Figures 2-21 - 2-23 are located after each figure. Installation instructions concerning MKR 371 L-810 marker fixtures are supplied with the marker kit. The system installation diagrams provided in this manual may not contain all of the required wiring information for installation at your site.

> **Important!** If installation drawings prepared specifically for your site disagree with information provided in this manual, the site installation drawings should take precedence. Consult any site-specific installation wiring diagrams supplied with your equipment.
>
> Flash Technology wiring diagrams define only minimum requirements recommended for satisfactory equipment operation. It is the responsibility of the installer to comply with all applicable electrical codes.

All communication wiring should have an insulation rating of 300 volts minimum. All power wiring should have an insulation rating of 600 volts. Input power wiring must be sized to satisfy the load demand of all connected SC 370 systems. Read the notes on the installation wiring diagrams supplied both in this manual and with the equipment.

Input Power

Input power conductor size depends on the service voltage, distance from the source and the number of units installed in the system. Assume 340 VA per SC 370 in the system. Connect the input power to L1, L2 (AC units) or +, - (DC units) and Ground terminals of TB1 located in the lower right of the cabinet.

> **Important!** For proper operation and optimal protection from Lighting and EMI, ensure that Earth Ground is wired to the Ground (Green) Terminal.

Photodiode Wiring

The photodiode must be connected to the SC 370 designated as System 1. The photodiode connections are located on PCB2 at terminal block P6. The white wire is connected to the terminal marked “WHT”, the black wire is connected to the terminal marked “BLK”, and the drain wire is connected to the terminal marked “SHLD”. Only one photodiode is required per system. It may be located any practical distance from System 1. The standard photodiode (Part # 1855516) is supplied with 20’ of cable. Photodiodes with cable lengths up to 75’ are available. Also, the cable may be spliced to provide additional length.

Photodiode Mounting

The photodiode, also referred to as PHD 516, is shown in Figure 2-1 and mounting and outline dimensions are shown in Figure 2-12. The photodiode uses a female 1/2” NPT for mounting. Use the following guidelines to mount the photodiode:

- Locate the photodiode where it has an unobstructed view of the polar sky.
- It must not view direct or reflected artificial light.
- The photodiode may be mounted at the top end of a vertical length of rigid conduit or to the optional Antenna Mounting Bracket kit (P/N 1905355). It should not be mounted underneath the controller where it could be shadowed.
- Ensure that the installation is watertight.

Note: See Cellular Antenna and GPS Antenna for additional information regarding the Antenna Mounting Bracket Kit.

Cellular Antenna

A Cellular antenna is required with either of the optional cellular modems shown in Figure 2-1. The supplied antenna mounting bracket accommodates bulkhead mount style antenna as shown in Figure 2-2. Figure 2-1 shows the bulkhead mount style antenna installed with the photodiode and GPS antennas. The antenna connects directly to the modem as shown in Figures 2-26 and 2-31. Follow the method below to install the antenna.

The system is shipped with the antenna preinstalled and the antenna cable's SMA connector torqued to specification onto the modem's antenna connector for optimal performance; do not remove or disconnect unless replacing the modem or antenna.

Important! For best communication performance and to minimize potential for surge damage to the modem radio module, it is very important that the supplied antenna mounting bracket be used for mounting the antenna and that the bracket be grounded with a minimum 14 AWG Ground wire connected to the site Grounding System. Also, if any excess antenna cable is coiled up, the coil diameter must not be less than 18 inches.

Maximum torque for the antenna's SMA connector must not exceed 8 inch-pounds (90 N-cm) using a 5/16'" torque wrench. Damage to the modem may occur if the connection is over tightened.

Choose a location for mounting the cellular antenna that will provide optimal reception. The included mounting bracket can simultaneously accommodate a Vanguard Photodiode, Cellular Antenna, and GPS Antenna as shown in Figure 2-1.

Note: The antenna must be mounted outdoors to ensure optimal reception. See "Photodiode Mounting" and "GPS Antenna" for additional considerations when selecting a mounting location for the Antenna Mounting Bracket.

1. Mount the Antenna Mounting Bracket using one of the following methods:
   - Wall Mount: Use screws (not included) to mount to the outside wall of a shelter.
   - Horizontal Unistrut Mount: Use spring-nuts (not included) to mount to unistrut.

     Vertical Pole or H-frame post Mount: Use 3" U-bolt (included) to mount to pole or H-frame post. The bracket permits use of larger U-bolts, up to 5".

   Important! Regardless of the mounting method selected, the antenna bracket must be grounded with a minimum 14 AWG Ground wire connected to the site Grounding System. Observe proper Grounding procedures.
2. The cellular antenna **must be mounted at the center of the bracket** as shown in Figures 2-1 and 2-2. Follow the location recommendations noted in "Photodiode Mounting" and "GPS Antenna" if it is installed along with the photodiode and/or GPS antenna.
3. To install the bulkhead mount style antenna, loosen the antenna mounting nut and washer and slide the antenna mount through the bracket's center slot. Tighten the hardware.
4. Secure the antenna cable to the mounting structure using cable ties.
5. Coil up any unused antenna cable inside the SC 370 enclosure. The diameter of the coil should be as large as possible.
6. Tighten the cable strain relief on the bottom of the SC 370 enclosure securely.

GPS Antenna

The GPS antenna, shown in Figure 2-1, is required with the GPS enabled PCB3 Smart Board shown in Figure 1-5. Follow the method below to install the GPS antenna.

Important! The GPS antenna must be mounted outdoors with an unobstructed view of the sky.

1. Disconnect AC power to the SC 370.
2. Open the enclosure door and install the cable strain relief and locknut into an available 1/2" hole in the enclosure bottom.
3. Route the antenna cable's small connector through the cable strain relief (from the enclosure outside) to the GPS antenna connection located on PCB 3 (see Figure 1-5). Route the cable along the right side of the enclosure. Plug the cable connector into the GPS antenna connection on PCB 3.
4. Attach the antenna cable to the side of the enclosure using the two pre-installed ribbon cable clamps.
5. For best reception and synchronization, choose a location for mounting the GPS antenna with an unobstructed view of the sky. The included mounting bracket can simultaneously accommodate a Vanguard Photodiode, Cellular Antenna, and GPS Antenna (see Figure 2-1).

Note: See "Photodiode Mounting" and "Cellular Antenna" for additional considerations when selecting a mounting location for the Antenna Mounting Bracket.

6. Mount the Antenna Mounting Bracket using one of the following methods:
   - Wall Mount: Use screws (not included) to mount to the outside wall of a shelter.
   - Horizontal Unistrut Mount: Use spring-nuts (not included) to mount to unistrut.
   - Vertical Pole or H-frame post Mount: Use 3" U-bolt (included) to mount to pole or H-frame post. The bracket permits use of larger U-bolts, up to 5".

Important! Regardless of the mounting method selected, the antenna bracket must be grounded with a minimum 14 AWG Ground wire connected to the site Grounding System. Observe proper Grounding procedures.

7. Mount the GPS antenna onto the mounting bracket using its large mounting nut.
8. Connect the antenna cable connector to the GPS antenna.
9. Secure the antenna cable to the mounting structure using cable ties.
10. Coil up any unused antenna cable inside the SC 370 enclosure. The diameter of the coil should be as large as possible.
11. Tighten the cable strain relief on the bottom the of SC 370 enclosure securely.
12. Verify that neither LED: Ant. Open or Ant. Short, shown in Figure 1-5, are lit once system power is restored. See Section 1 GPS Sync. Kit for additional information regarding the Ant. Open and Ant. Short LEDs.

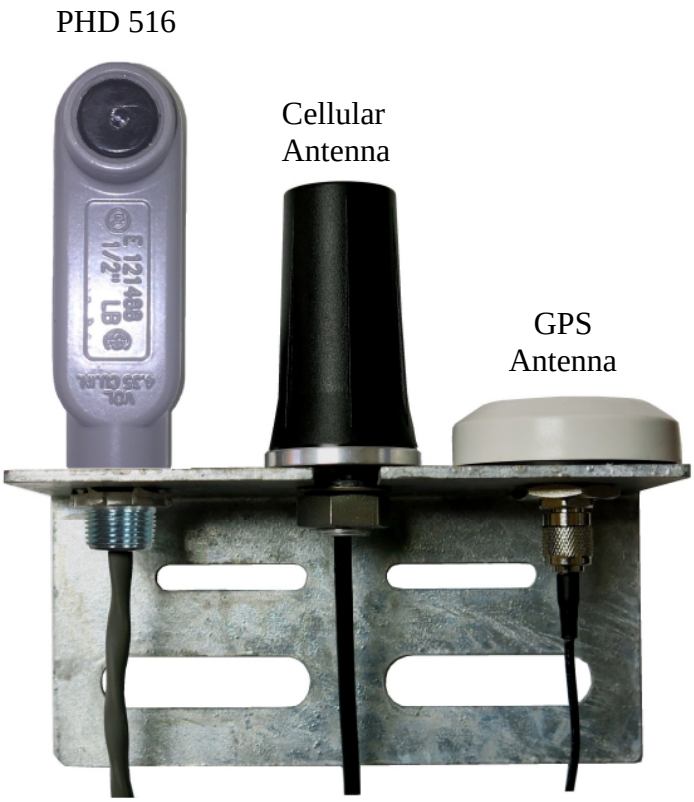


Figure 2-1 – Antenna Mounting Bracket with PHD 516, Cellular and GPS Antennas

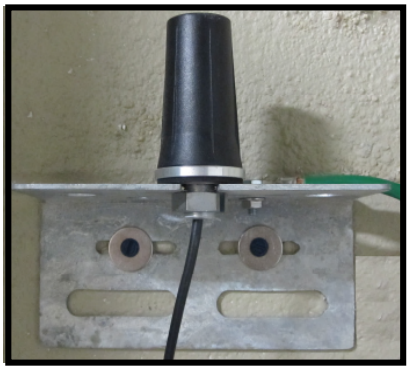
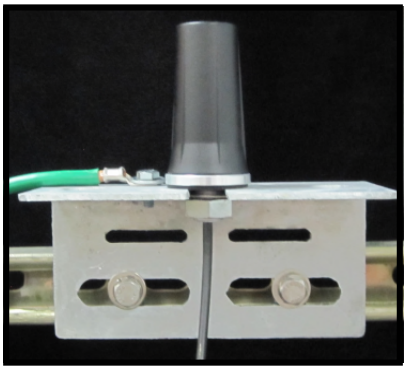
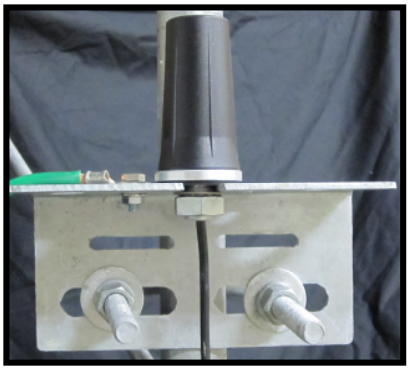
Wall Mount	Horizontal Uni-strut Mount	Vertical Pole or H-frame post Mount
Use screws to mount to the inside or outside wall of a shelter. ***(Screws are not included in the kit.)***	Use spring-nuts to mount to Uni-strut. ***(Spring-nuts are not included in the kit.)***	Use 3” U-bolt (***included***) to mount to pole or H-frame post. The bracket permits use of larger U-bolts, up to 5”.
		

Figure 2-2 – Antenna Mounting Options

Communication Cable Kit

A CAT 5 cable provides the RS 485 communications link between the SC 370 designated as System 1 and all subordinate units installed in the system. Two connections at J4 on PCB1 allow multiple units to be daisy chained together. Either port may be utilized as an input to or output from PCB 1.

The required number of Communication Cable Kits (P/N 4362039) is supplied with each complete SC 370 system. Each kit consists of a cable and two strain relief connectors with inserts for the cable. One strain relief is to be installed in System 1 and the other in System 2. Follow the method below for routing the cable if flexible conduit is not utilized for the installation.

1. Install the ¾" cable strain relief on the enclosure.
2. Install the connector insert over the cable with tapered end facing away from the connector.
3. Push the connector through the housing from outside the enclosure.
4. Push the cable insert into the strain relief housing.
5. Plug the cable into PCB1 and position the cable, providing a small amount of slack inside the cabinet to reduce stress on the connector. Coil excess cable equally between enclosures. Do not cut and splice to remove excess cable.
6. Tighten the strain relief connector dome nut.
7. Repeat steps 1-7 to connect additional SC 370 units (3-6).

Wi-Fi Option Antenna Installation

All internal components of the optional Wi-Fi access point are factory installed. The antenna must be installed after the SC 370 is mounted. The following instructions are provided to mount the antenna to the SC 370 enclosure using the supplied hardware kit. Figure 2-3 provides a pictorial of the installation. Connection to the Wi-Fi access point is discussed in Section 4.

1. Locate the following items supplied with the SC 370 system:
   - Wi-Fi Antenna (P/N 5905131)
   - Shielded CAT 5 Cable 6' (P/N 4362028)
   - Antenna Mounting Kit (P/N 1370191)
     - Conduit Hub with lock ring
     - Conduit Nipple 0.75" x 12"
     - Coupling
     - Cable Strain Relief
     - Custom Insert (Cable Strain Relief)
     - (2) Adjustable Clamp 1 1/16" – 2"
2. Attach the conduit hub to one end of the 12" nipple and the coupling to the other end.
3. Screw the strain relief into the coupling.
4. Locate and remove the access cover from the back of the Wi-Fi antenna. Remove the knockout that is located below the ground terminal.
5. Center the Wi-Fi antenna on the conduit assembly and attach using the two adjustable clamps. The top of the Wi-Fi antenna must be located nearest the conduit hub.
6. Locate an available 0.88" hole on the SC 370C unit and install the antenna assembly. See Figure 2-9 for the SC 370 hole configuration.
7. Connect the CAT 5 cable to the RJ 45 connector located on the Wi-Fi antenna. Route the other end of the CAT 5 cable through the strain relief and into the SC 370. Leave a small drip loop between the antenna and the conduit assembly.
8. Route the CAT 5 cable to the Power Over Ethernet (POE) Injector and connect to the terminal labeled "POE".
9. Install a ground wire (8 AWG recommended) from the antenna ground terminal to the site ground.
10. Replace the access cover.

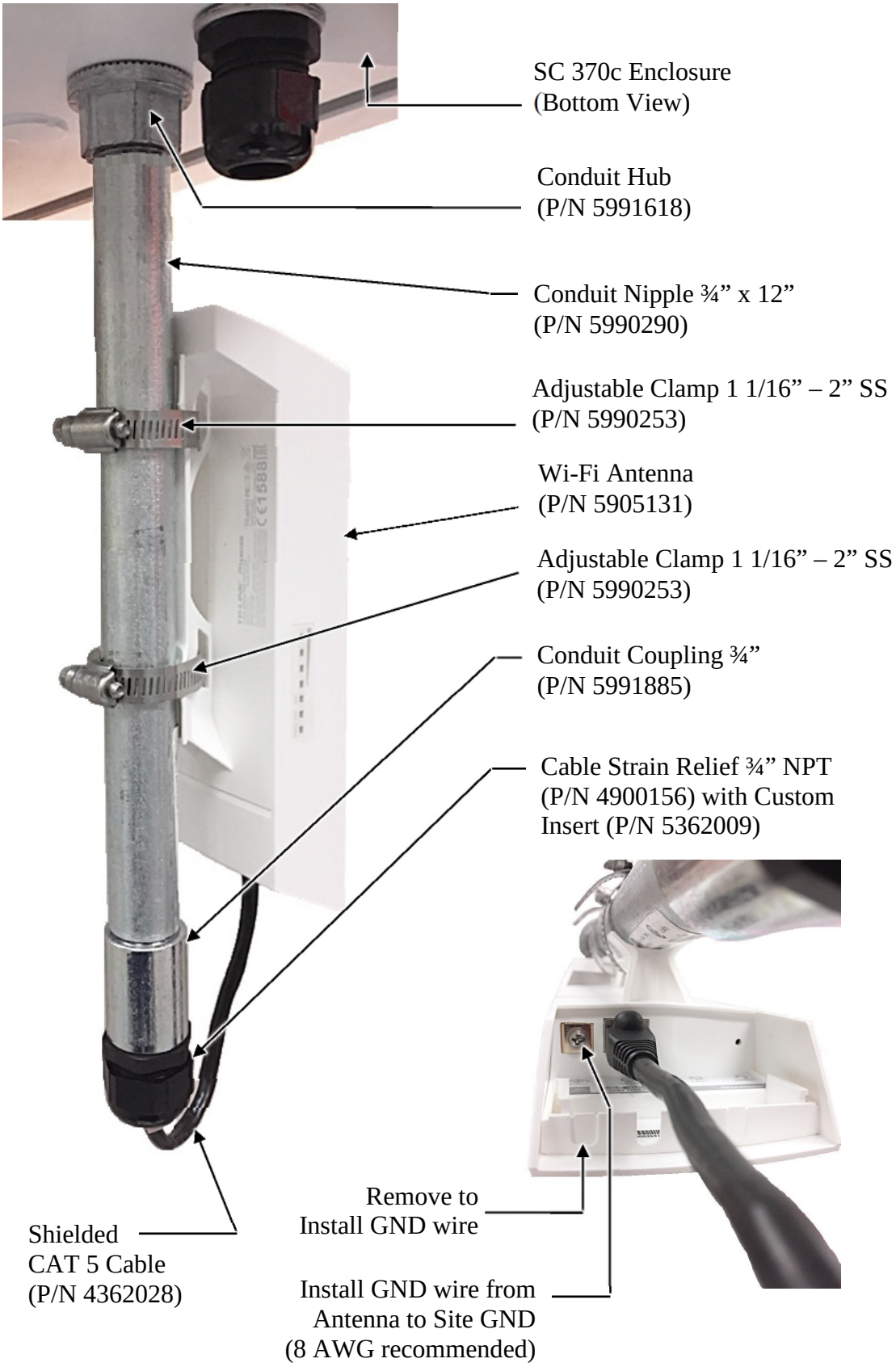


Figure 2-3 – Wi-Fi Antenna Installation

USB Wi-Fi (Optional)

An optional USB Wi-Fi adapter can be carried as a diagnostic tool and plugged into the SC 370 while onsite and then removed before leaving the site. The adaptor should not be left onsite in the SC 370.

All SC 370 units operating with V3.1 Firmware or higher can interface with an optional internal USB Wi-Fi adaptor. Connection point is on PCB3 (shown in Figure 2-4).

Must have PCB3 Smart Board (PN 2424500 or 2424501) to utilize this feature.

The USB Wi-Fi adaptor allows the ability to program, troubleshoot, and view critical information about the system without interfacing with the main display screen. All programming will be done via a web page interface described in Section 4.

The adaptor can be purchased directly from Flash Technology using PN 5905233.

Figure 2-4 – USB Wi-Fi Installation

Dry Contact Alarm Outputs

Dry contact alarm outputs, located on PCB1, are available regardless of any additional monitoring method used. The available dry contact alarm outputs are listed in Table 1-5 and shown in Figure 1-4. Each contact can be wired as normally open or normally closed.

> **NOTE:** The alarm relay contacts are labeled to represent their state with the unit powered on and with no alarms present.
>
> To ensure proper alarm monitoring, Flash Technology recommends monitoring contacts that are open in an alarm condition.

Flashhead Cable

Flash Technology cable provides optimal system performance while minimizing vulnerability to Lightning and EMI (Electromagnetic Interference).
The cable is comprised of two conductors with an overall aluminized Mylar shield and drain. The flashhead cable connects to TB2 in the lower left of the SC 370 as shown in Figure 2-5.
For shorter cable runs up to 375 ft., flashhead cable PN 4210000 (10 AWG) can be used. This cable is lighter and easier to work with than the larger gauge cable required for longer runs, having smaller conductors. Flashhead Cable PN 4370000 (8 AWG) permits cable lengths up to 600 ft. Flashhead cable PN 4206000 (6 AWG) allows cable lengths of up to 850 ft.

Wiring Procedure

1. Prepare the flashhead cable:
   a. Remove 6 inches of the outer jacket.
   b. Remove the exposed aluminized Mylar shield and any filler material between conductors.
2. Loosen the dome nut of the ¾" cable strain relief located in the bottom of the enclosure near TB2 and insert the cable.
3. Connect the three conductor flashhead cable to terminal strip TB2 using a non-flared flat tip screwdriver:
   a. Connect the red wire to the terminal labeled DC+.
   b. Connect the black wire to the terminal labeled DC-.
   c. Connect the bare drain wire to the terminal labeled GND.
4. Leaving slack in the flashhead cable, tighten the dome nut so that the cable is held securely in place.

> **NOTE:** Install a 5' service loop in the cable near the controller.

Figure 2-5 – SC 370 Flashhead Cable Connection

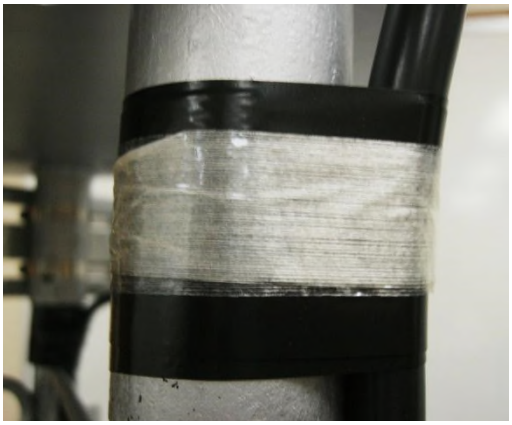
Securing the Cable: 2-3-4 Tape Method

Flash Technology provides the material for securing the flashhead cable to a skeletal structure with the following technique.

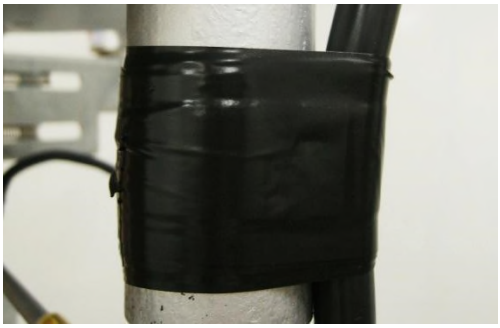
Always adhere to local electrical codes that could supersede this recommended technique:

1. Run the cable along one of the tower legs and wrap two full turns of two-inch Scotchrap™ #50 tape, or the equivalent, around the cable and tower leg.

2. Wrap three full turns of one-inch Scotchrap Filament #890 tape, or the equivalent, over the Scotchrap #50 tape.



3. Wrap four full turns of two-inch Scotchrap #50 tape, or the equivalent, over the Scotchrap Filament #890 tape.



4. Ensure there is at least a 4 to 5 foot (1.5 meters) separation between taping sections per NEC.

Flange Stress Relief – Secure the cable above and below each flange approximately 6 inches by performing steps 1 through 3 to allow a 1 inch to 3 inch separation from the flange and the cable.

Marker Interface Enclosure

(FTS 370d L-864/865 only)

> **Note:** Complete instructions for installing the Marker Interface Enclosure, marker mounting brackets and MKR 371 L810 markers are provided with the marker kit. Refer to "Vanguard® Marker Installation" (Part # 7904214) for specific information regarding cable connection to the MKR 371.

Wiring information is provided in the following steps. Figure 2-6 shows the Marker Interface Enclosure with three markers connected. Figure 2-22 shows a system installation diagram. Figure 2-32 shows the recommended cable routing and an internal wiring diagram for the Marker Interface Enclosure.

> **Note:** The Marker Interface Enclosure should be located at the marker tier level. A pictorial detailing the mounting of the Marker Interface Enclosure is included with the Marker Kit installation instructions (Drawing PN 7790107 or 7790108).

Wiring Procedure

1. Observing the procedures described previously in "Flashhead Cable" and "Securing the Cable", install a 5' service loop in the cable near the marker interface enclosure.
2. Prepare the flashhead cable:
   a. Remove 6 inches of the outer jacket.
   b. Remove the exposed aluminized Mylar shield and any filler material between conductors.
3. Loosen the dome nut of one of the ¾" cable strain reliefs located in the bottom of the enclosure. Route the flashhead cable from the flashhead through the strain relief and tighten the dome nut.
4. Connect the three conductor flashhead cable to the terminal strip TB1 using a non-flared flat tip screwdriver:
   a. Connect the red wire to one of the two terminals on the top row labeled DC+.
   b. Connect the black wire to one of the two the terminals on the top row labeled DC-.
   c. Connect the bare drain wire to one of the two the terminals labeled GND.
5. Loosen the dome nut of one of the ½" cable strain reliefs located in the bottom of the enclosure. Insert 12" of marker cable through the cable strain relief and tighten the dome nut.
6. Prepare the marker cable by removing 4 inches of the outer jacket and any filler material between conductors.
7. Connect the marker cable to connector J1 located on the marker interface board:
   a. Connect the red wire to the terminal labeled DC+.
   b. Connect the black wire to the terminal labeled GND.
   c. Connect the drain wire to the terminal labeled EARTH.
8. Route the cable to the marker light following the instructions supplied with the marker kit.
9. Repeat steps 4-8 for the remaining markers to be installed.
10. Install the flashhead cable from the marker interface enclosure to the FH 370d by repeating steps 1-3.

> **NOTE:** A 5' service loop should be installed for each flashhead cable section (SC 370d to Marker Interface & Marker Interface to FH 370d) near the marker interface enclosure.

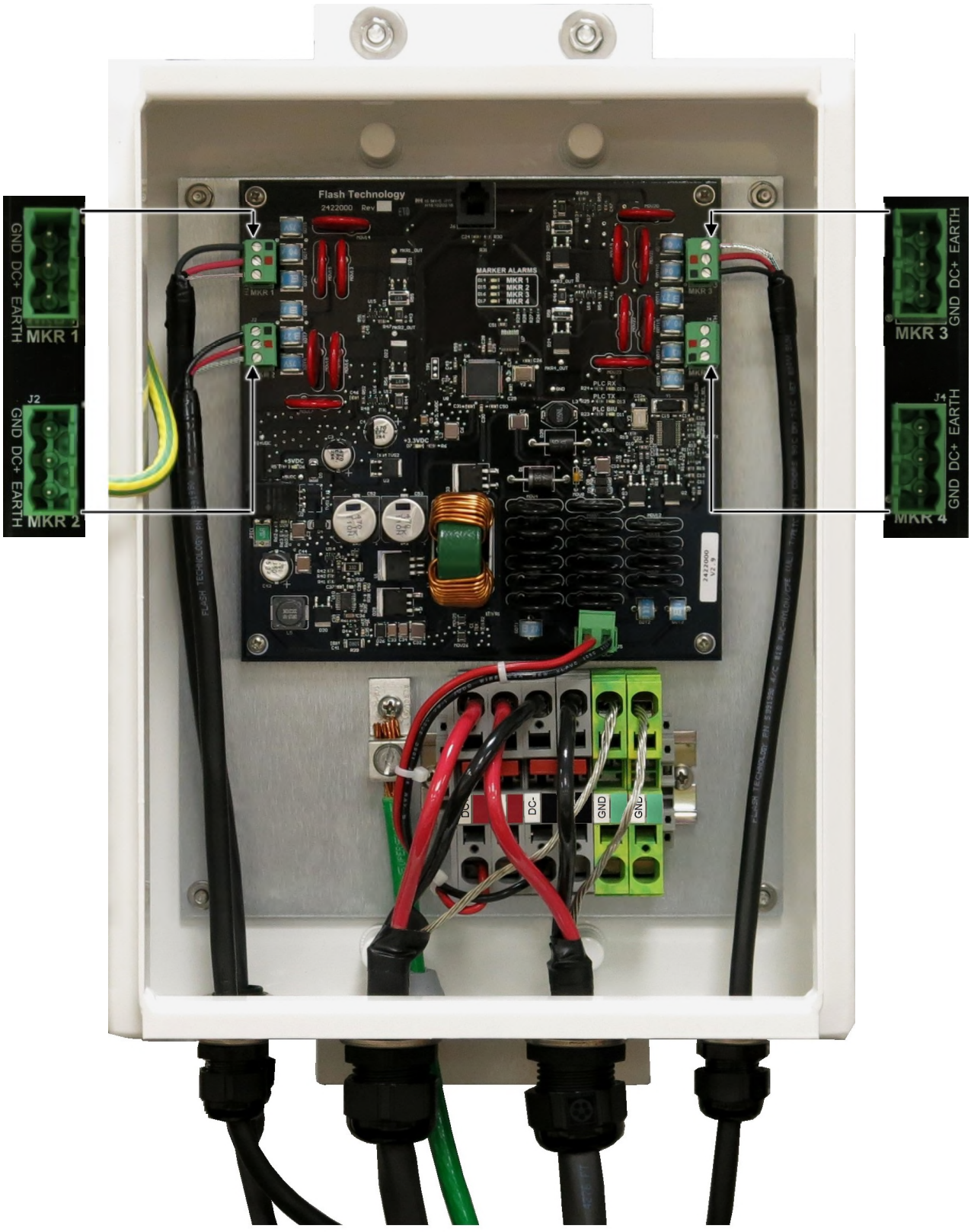


Figure 2-6 – Marker Interface Wiring

Flashhead Installation

Mounting

Flash Technology recommends the installation of one or more lightning rods near the uppermost flashhead(s). The copper lightning rods should extend a minimum of 36" above the height of the flashhead and a minimum of 18" horizontally away from the flashhead.

The flashhead is mounted to the tower pedestal utilizing ½ inch galvanized or stainless steel hardware. Four mounting holes are provided on the flashhead base (Figure 2-13). The mounting holes will align with most tower pedestals. The flashhead must be installed level to maintain light output in accordance with FAA requirements.

Leveling

1. Verify that the mounting surface is free of debris.
2. Align the four mounting holes in the base of the flashhead with the holes in the tower or pedestal's mounting plate.
3. Leaving the hardware assemblies loose, secure the flashhead with ½ inch stainless steel or galvanized hardware (Part # 5991777).
4. With the light engine secured by the two latches on the base, place a level on top of the flashhead and verify that it is level in two directions.

   Note: Flash Technology's "T"- Level (Optional Part # 11000013455) has two vials to simplify installation.
5. If the flashhead is not level, add stainless steel shim material or washers (stainless steel or galvanized) as necessary to level the flashhead.
6. Tighten the hardware once the flashhead is level in both directions. Verify that the flashhead is level when the hardware is fully tightened. If necessary, loosen the mounting hardware and repeat Step 5 until the flashhead is level with the hardware fully tightened.

Figure 2-7 – Flashhead Leveling

Wiring

NOTE: Install a 5' service loop in the cable near the flashhead.

1. With the flashhead securely mounted to the tower, unfasten the two latches that secure the light engine (top assembly) to the base.
2. Lift the light engine assembly to expose the flashhead terminal block.
3. Prepare the flashhead cable:
   a. Remove 6 inches of the outer jacket.
   b. Remove the exposed aluminized Mylar shield and any filler material between conductors.
4. Loosen the dome nut of the provided strain relief on the FH 370 and insert the cable.
5. Connect the three conductor flashhead cable to the terminal strip using a non-flared flat tip screwdriver:
   a. Connect the red wire to the terminal labeled DC+.
   b. Connect the black wire to the terminal labeled DC-.
   c. Connect the bare drain wire to the terminal labeled GND.
6. Secure the cable by tightening the dome nut on the strain relief.
7. Ensure all wiring is tucked inside the flashhead base to avoid pinching.
8. Close the flashhead and secure the two latches.
9. Using 8 AWG wire minimum, ground the flashhead to the tower utilizing the flashheads external ground lug. Avoid sharp bends in the ground wire (bends must be greater than 90 degrees).

Important! The flashhead must be grounded to the tower using 8 AWG wire minimum. It is recommended that all exposed ground connections are coated with a corrosion inhibitor (NO-OX or equivalent).

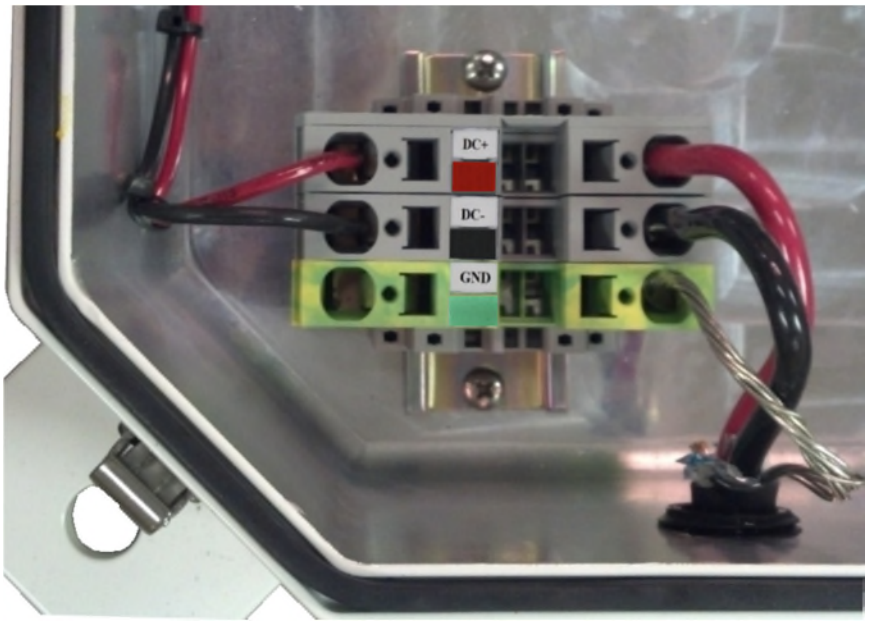
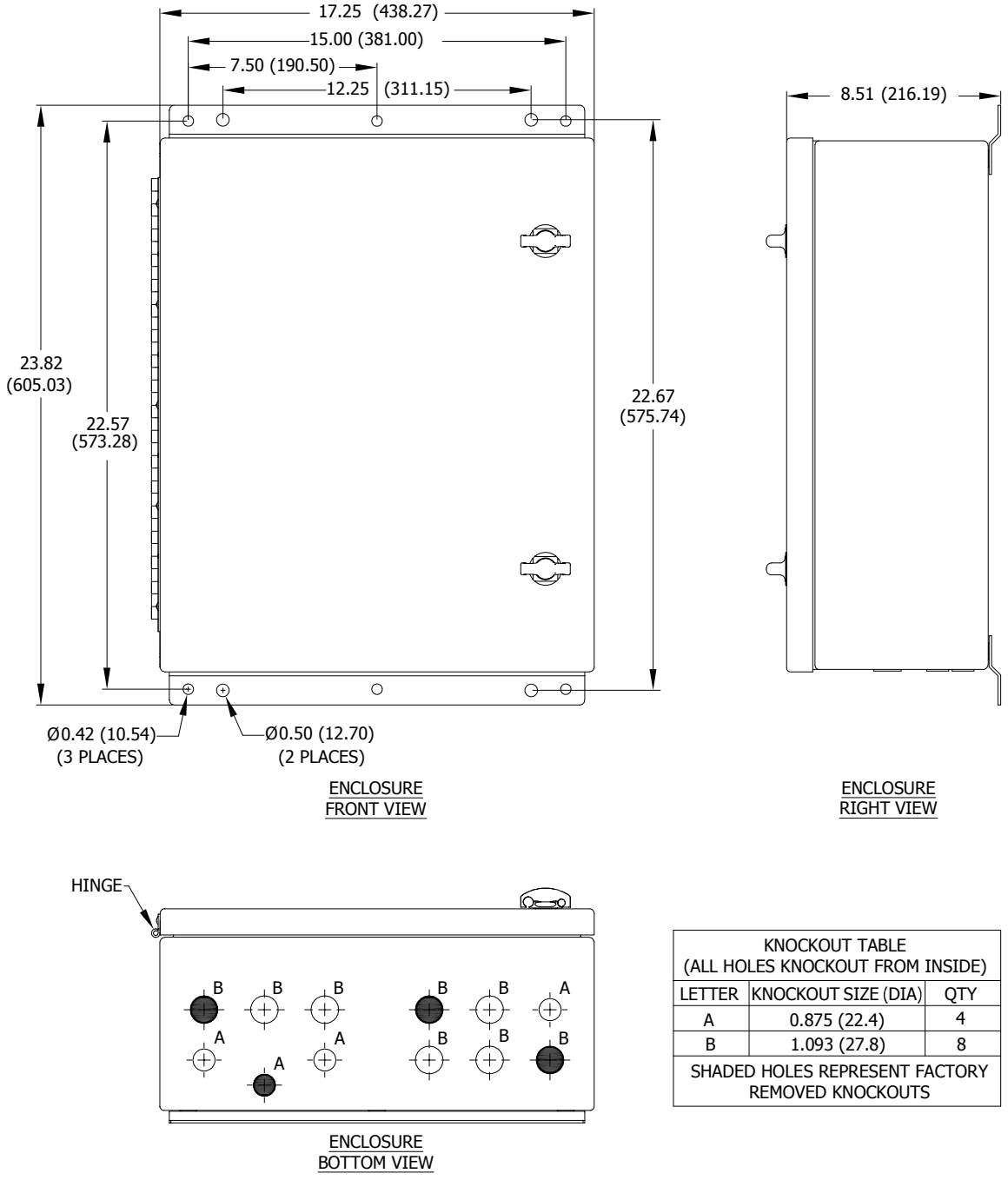


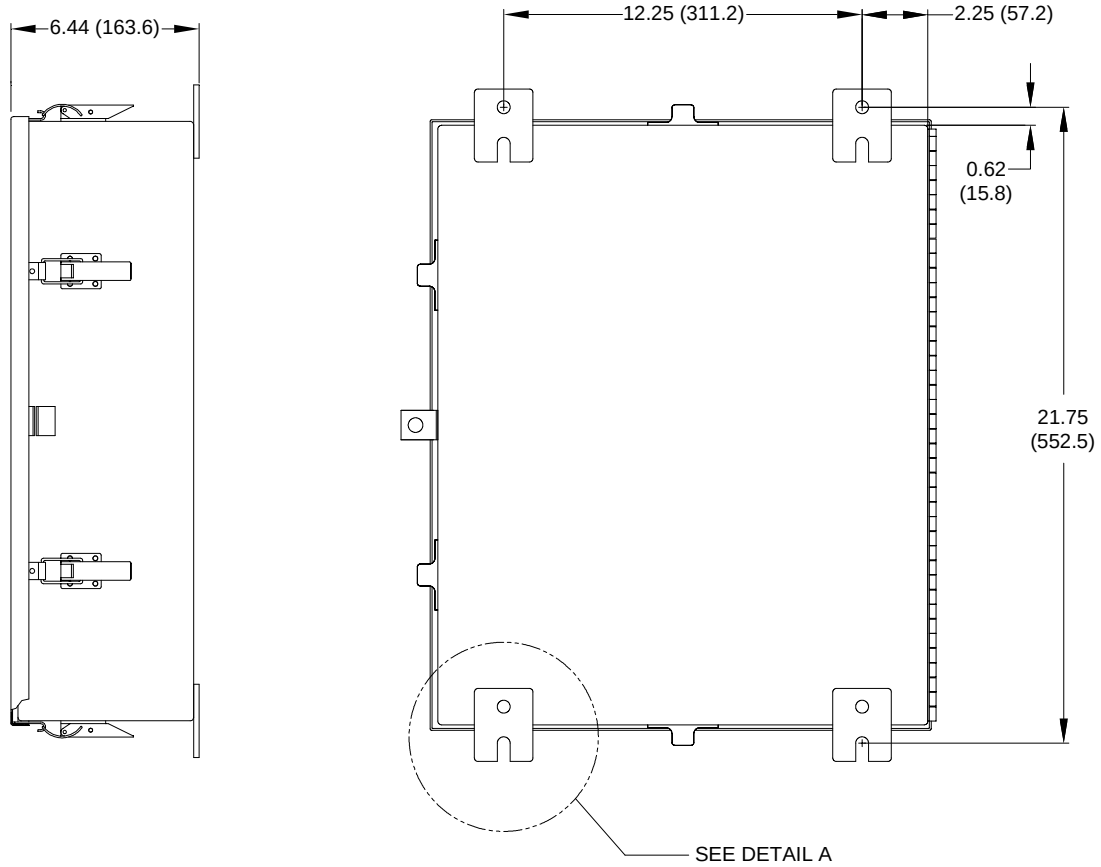
Figure 2-8 – Flashhead Cable Terminal Block

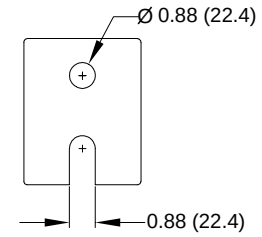


KNOCKOUT TABLE (ALL HOLES KNOCKOUT FROM INSIDE)		
LETTER	KNOCKOUT SIZE (DIA)	QTY
A	0.875 (22.4)	4
B	1.093 (27.8)	8
SHADED HOLES REPRESENT FACTORY REMOVED KNOCKOUTS		

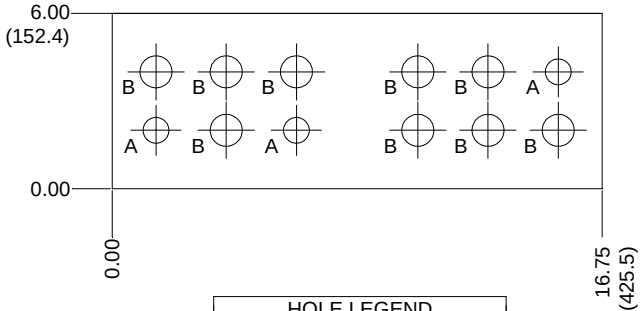
Note: All dimensions are in inches (millimeters).

Figure 2-9 – SC 370 Mounting and Outline (Painted Aluminum Option)





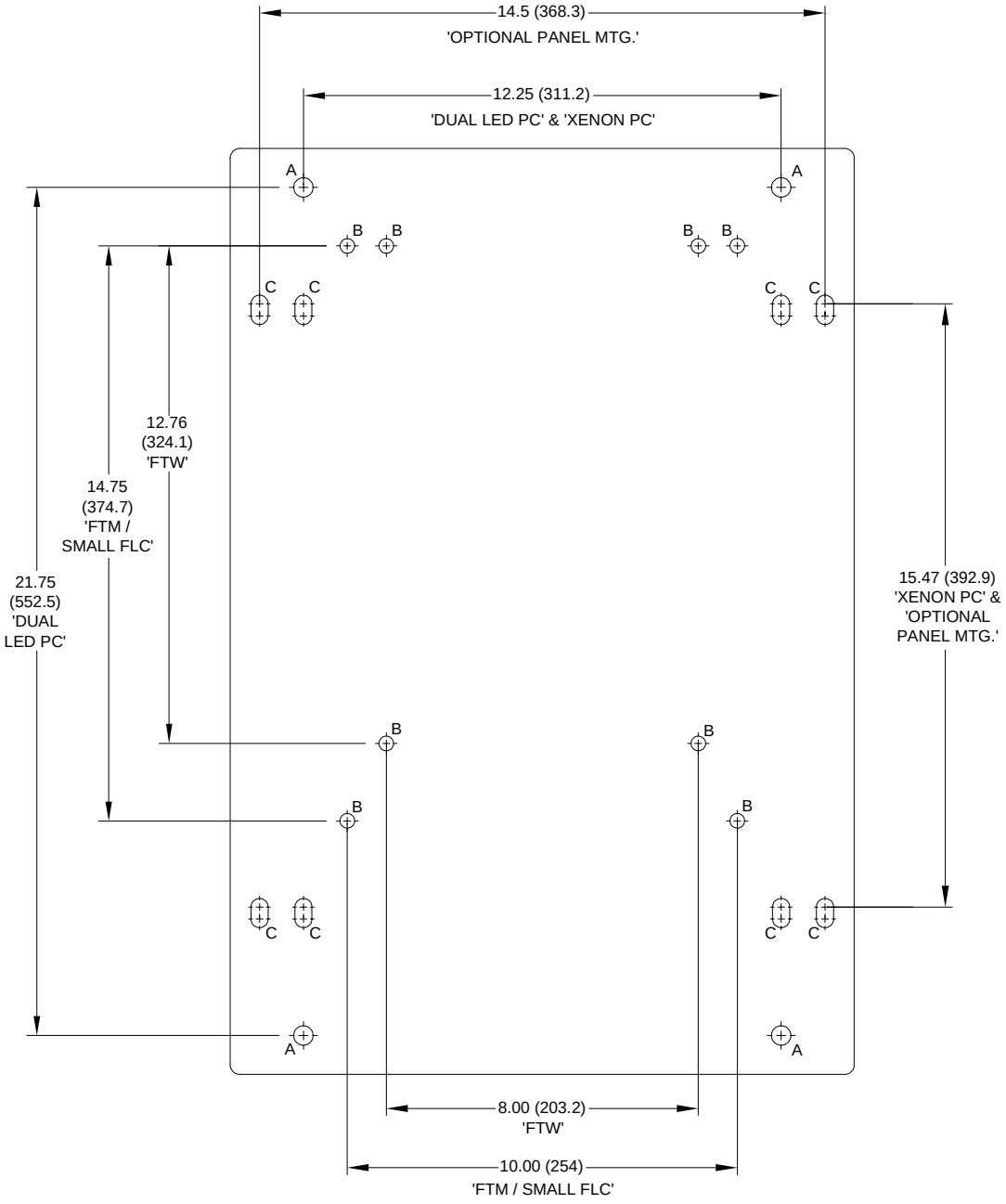
DETAIL A



HOLE LEGEND		
SYM	HOLE DIA.	QTY
A	0.88 (22.4)	3
B	1.093 (27.8)	9

Note: All dimensions are in inches (millimeters).

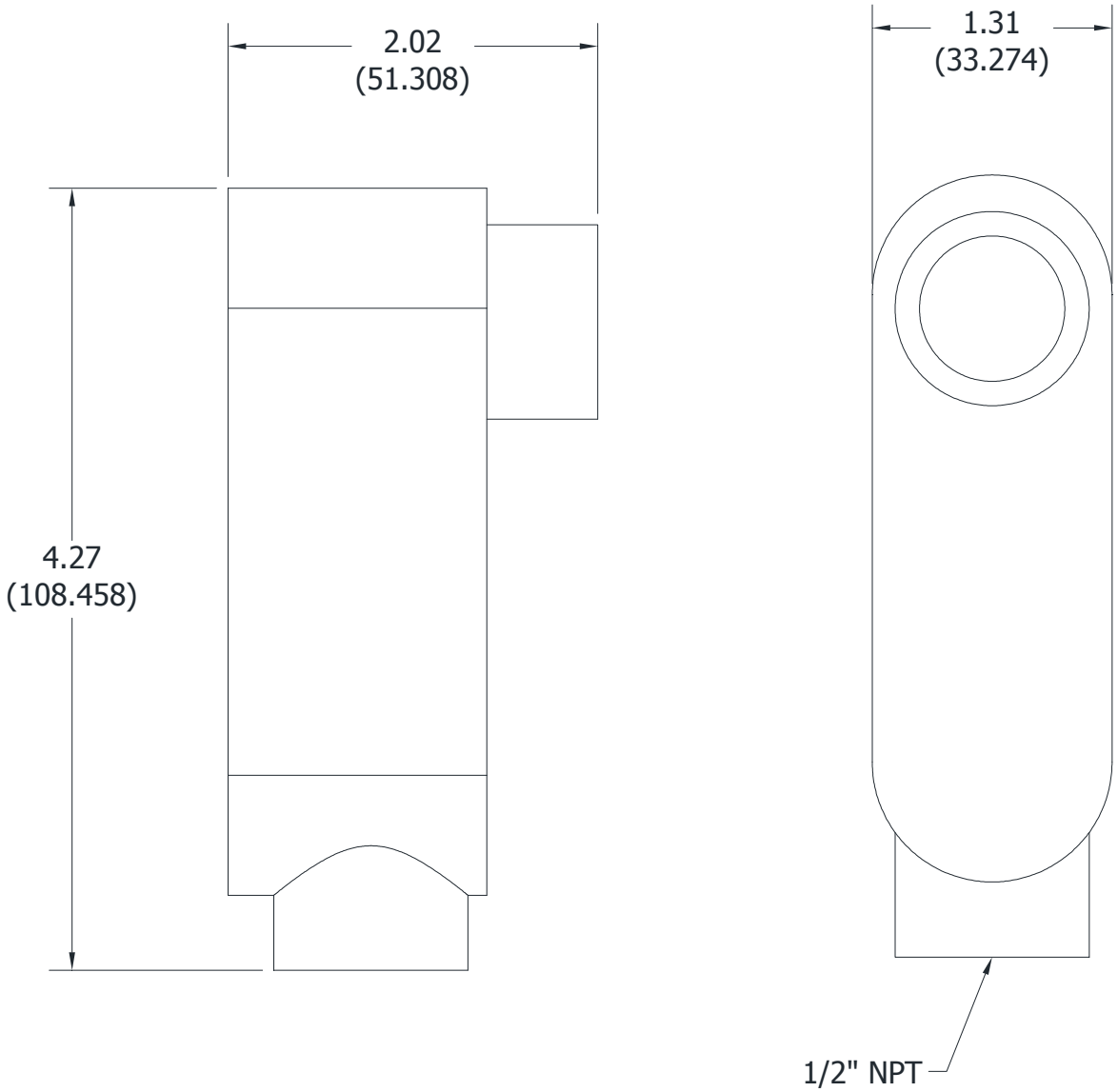
Figure 2-10 – SC 370 Mounting and Outline (Stainless Steel Option)



HOLE CHART		
LETTER	HOLE SIZE	QTY
A	0.50 (12.7) DIA THRU	4
B	0.38 (9.7) DIA THRU	8
C	0.44 (11.2) X 0.75 (19.1) LG SLOT THRU	8

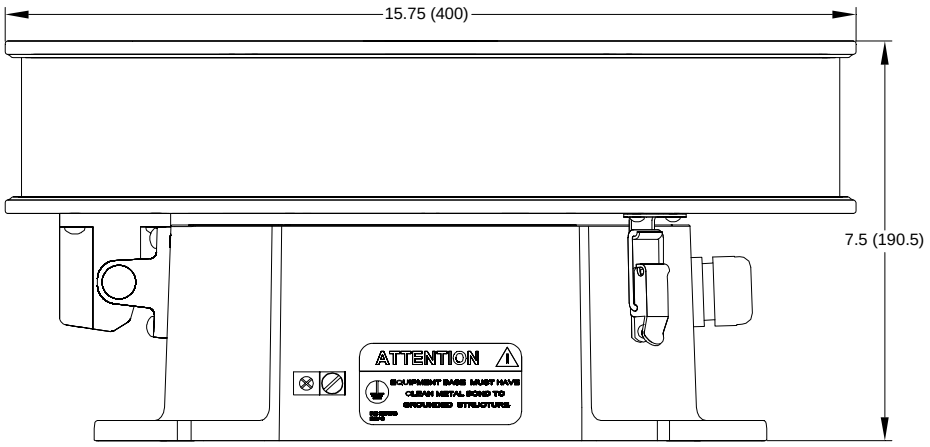
Note: All dimensions are in inches (millimeters).

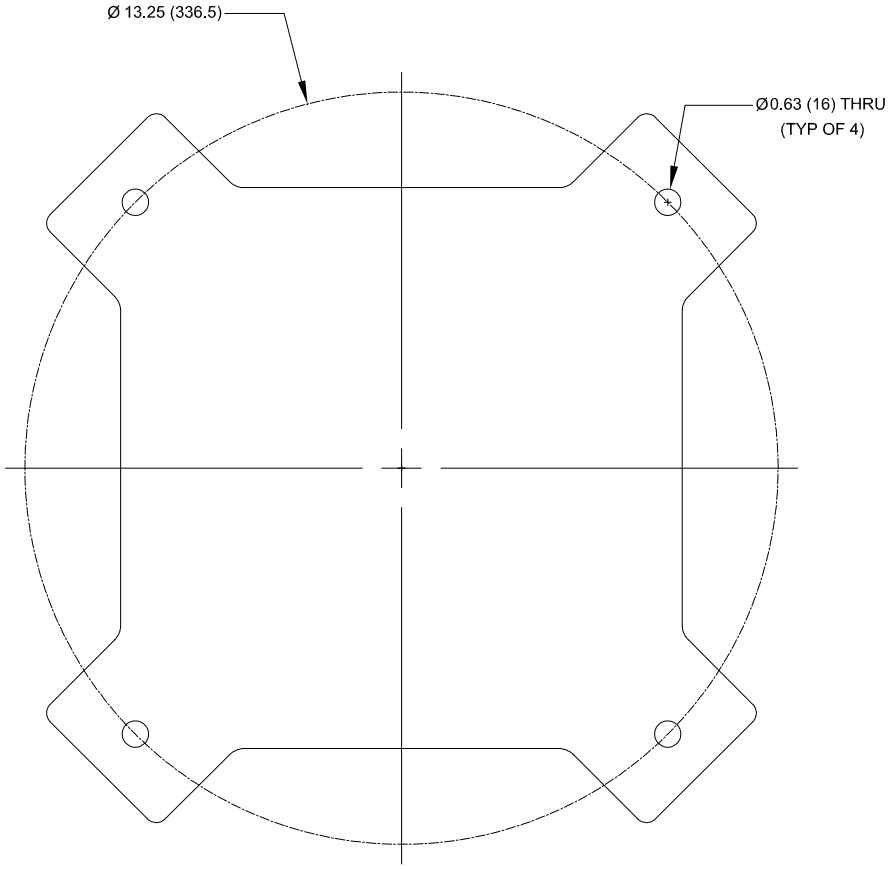
Figure 2-11 – Adapter Mounting Panel Mounting and Outline (Optional)



Note: All dimensions are in inches (millimeters).

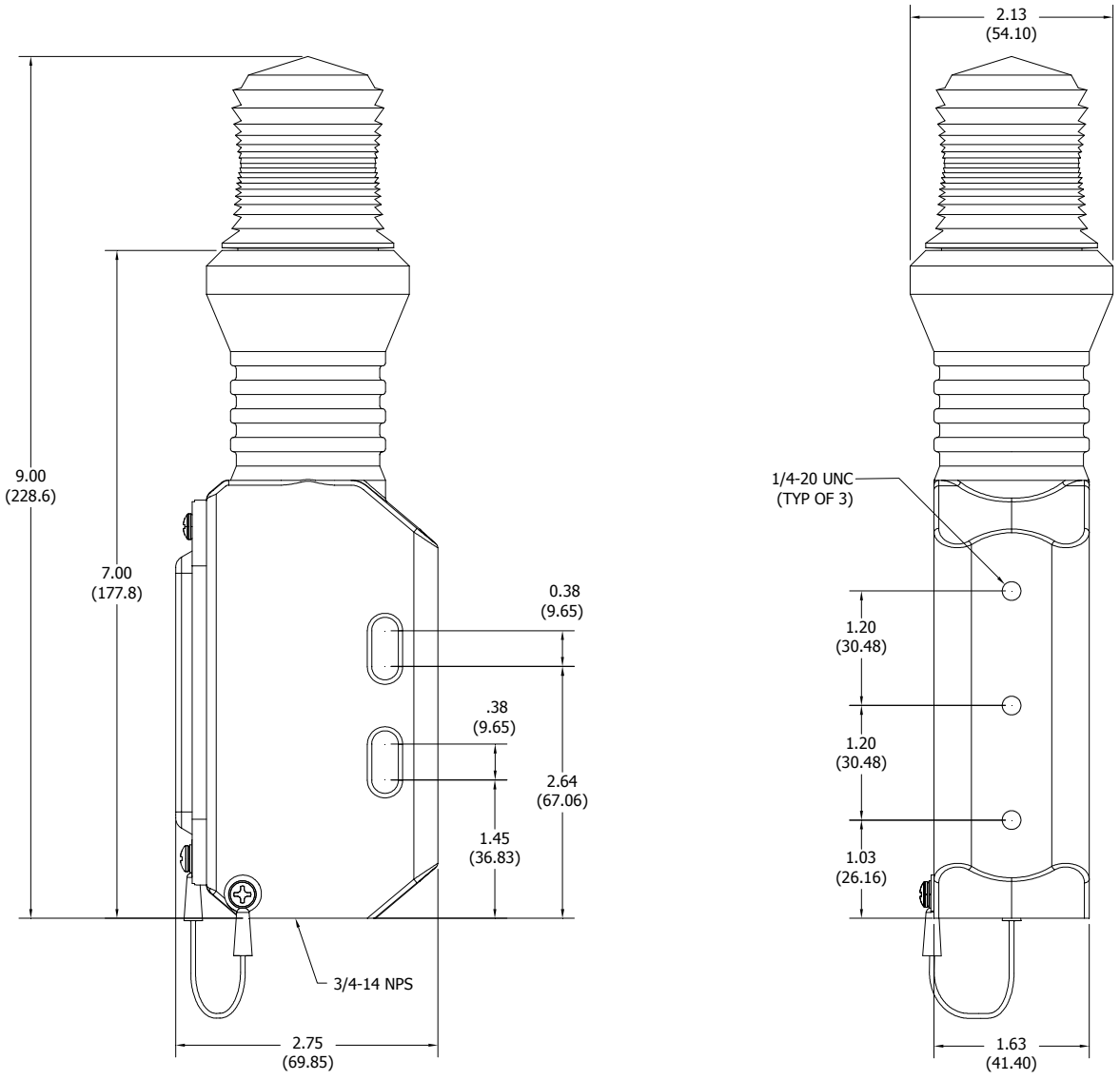
Figure 2-12 – Photodiode Mounting and Outline





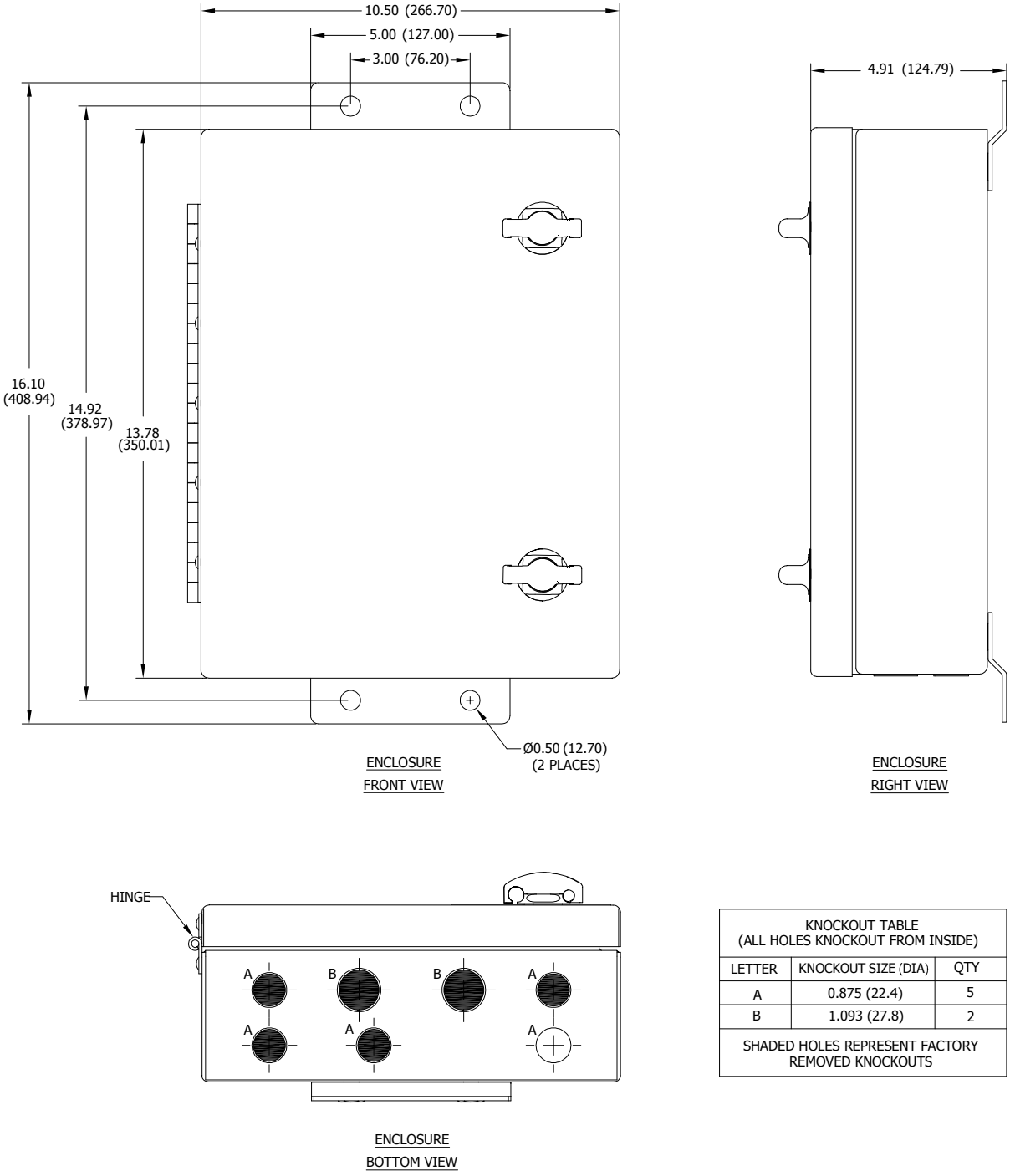
Note: All dimensions are in inches (millimeters).

Figure 2-13 – Flashhead Dimensions and Mounting Outline



Note: All dimensions are in inches (millimeters).

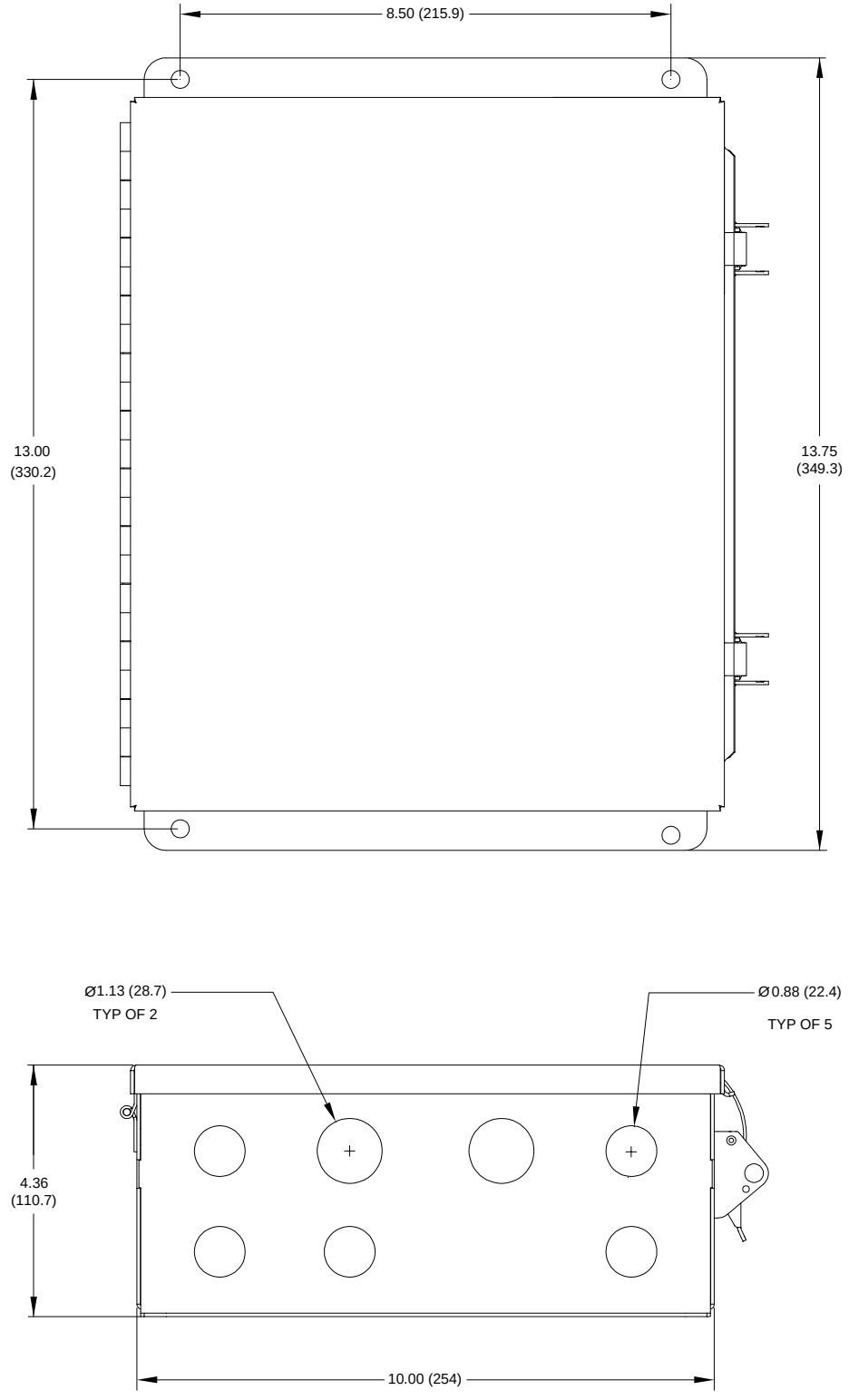
Figure 2-14 – MKR 371 Mounting and Outline



KNOCKOUT TABLE (ALL HOLES KNOCKOUT FROM INSIDE)		
LETTER	KNOCKOUT SIZE (DIA)	QTY
A	0.875 (22.4)	5
B	1.093 (27.8)	2
SHADED HOLES REPRESENT FACTORY REMOVED KNOCKOUTS		

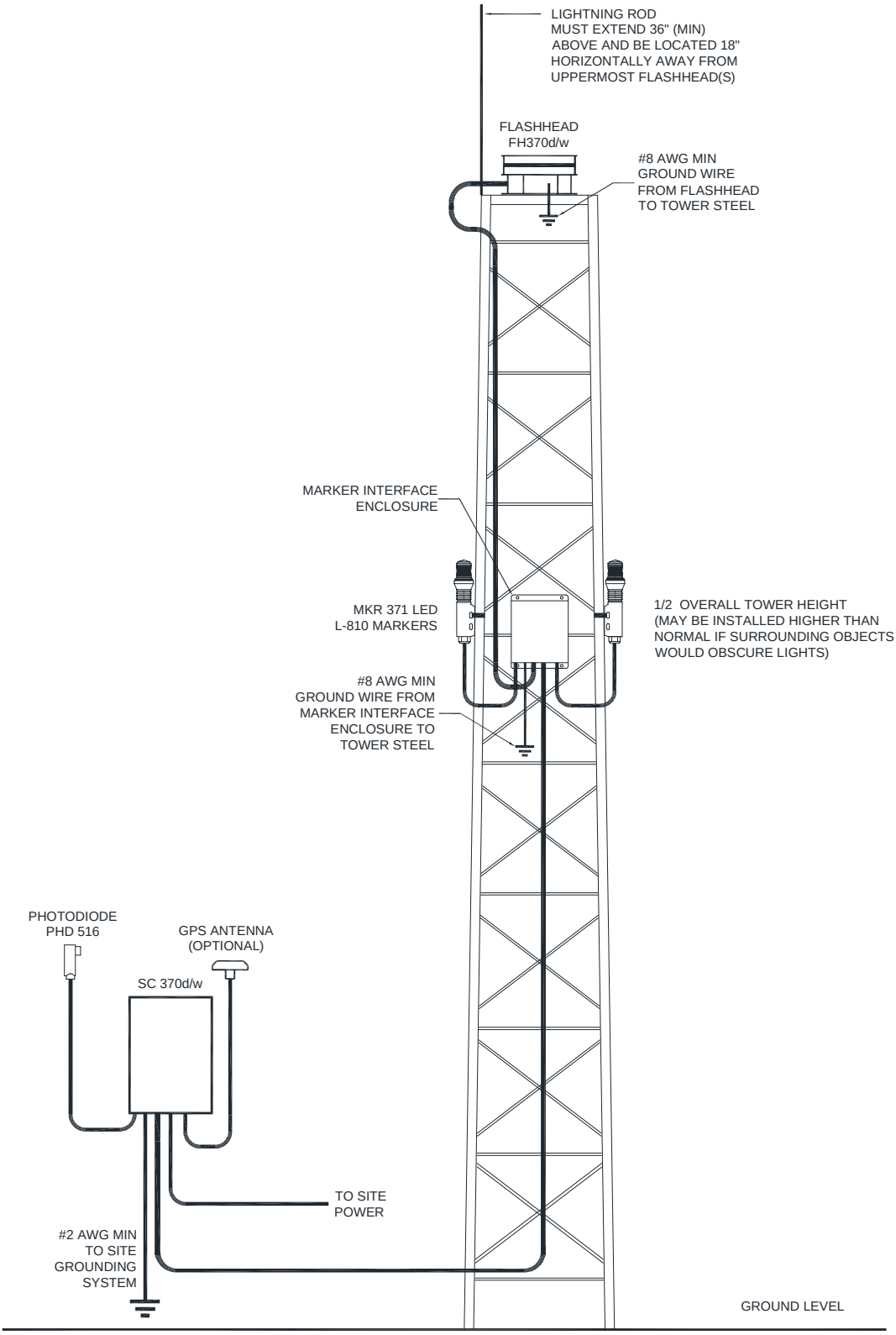
Note: All dimensions are in inches (millimeters).

Figure 2-15 – Marker Interface Mounting and Outline (Painted Aluminum Option)



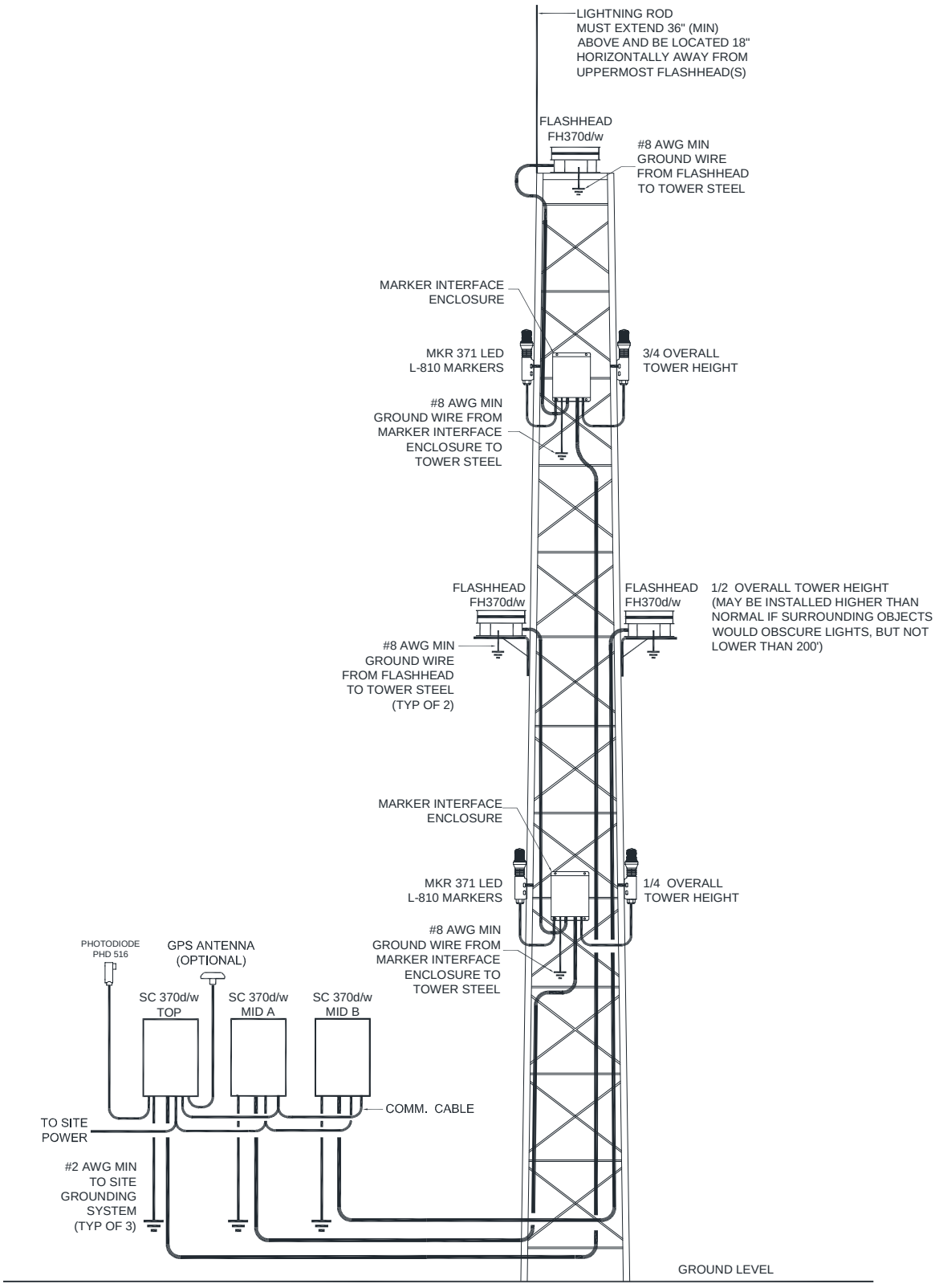
Note: All dimensions are in inches (millimeters).

Figure 2-16 – Marker Interface Mounting and Outline (Stainless Steel Option)



Note: Markers and Marker Interface Enclosure are omitted for D1 Installation and for version AC 70/7460-1L filed structure that are over 200' but not more than 350'.

Figure 2-17 – Typical E1/D1 Component Locations



Note: Markers and Marker Interface Enclosure are omitted for D2 Installation and for version AC 70/7460-1L filed structure that are over 350' but not more than 700'.

Figure 2-18 – Typical E2/D2 Component Locations

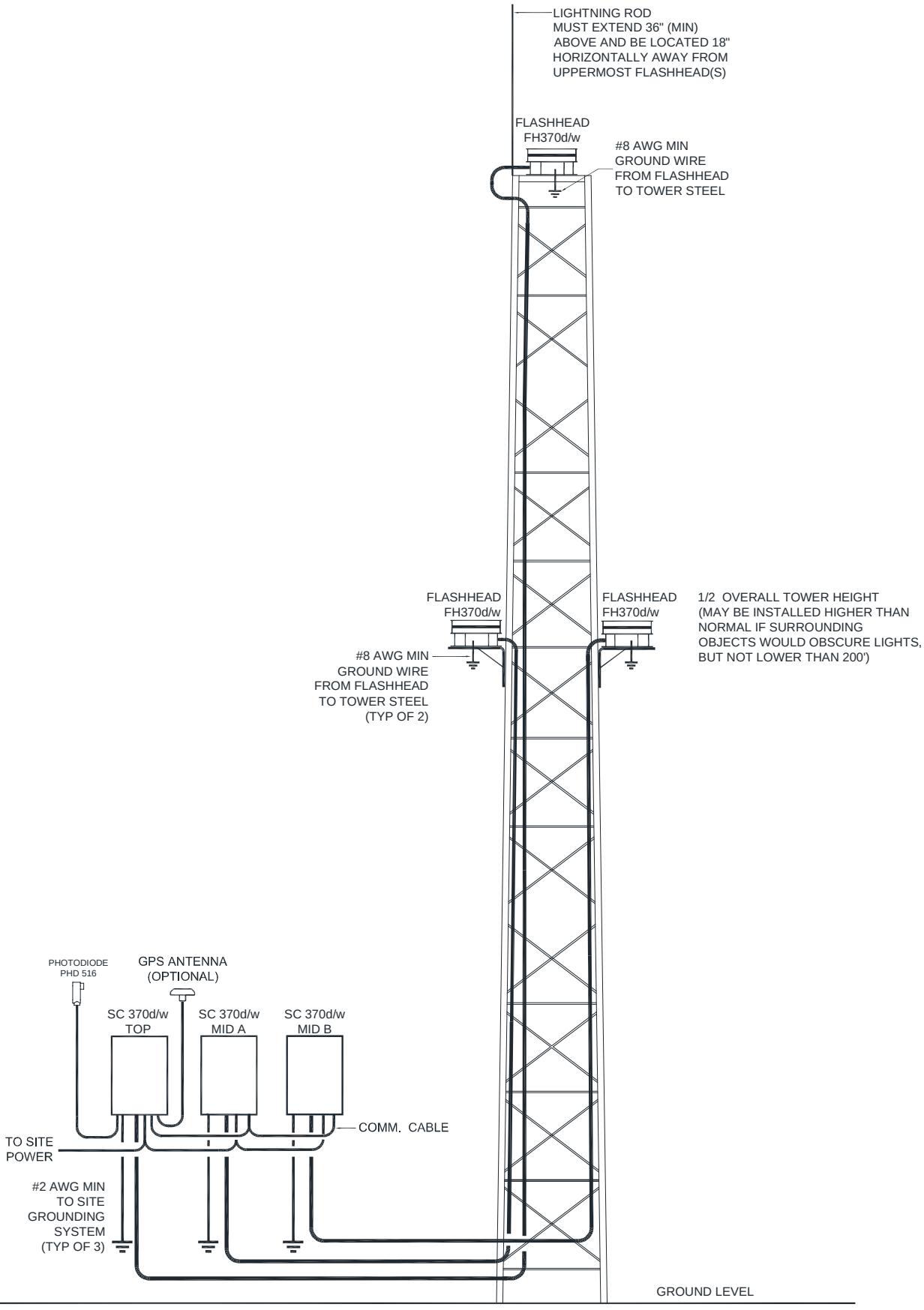


Figure 2-19 – Typical E2/D2 Avian Component Locations (AC 70/7460-1L)

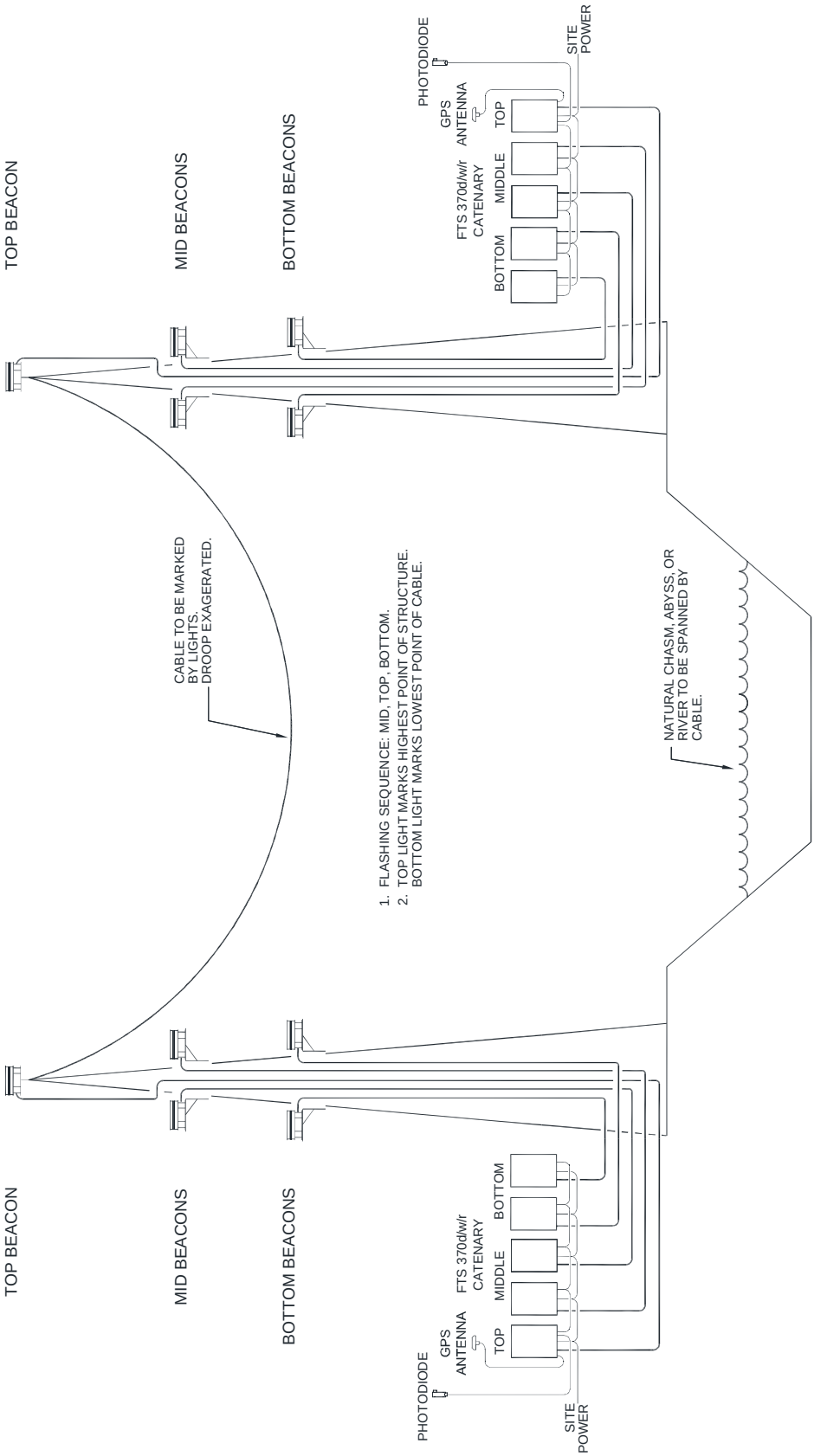


Figure 2-20 – Typical Catenary Component Locations

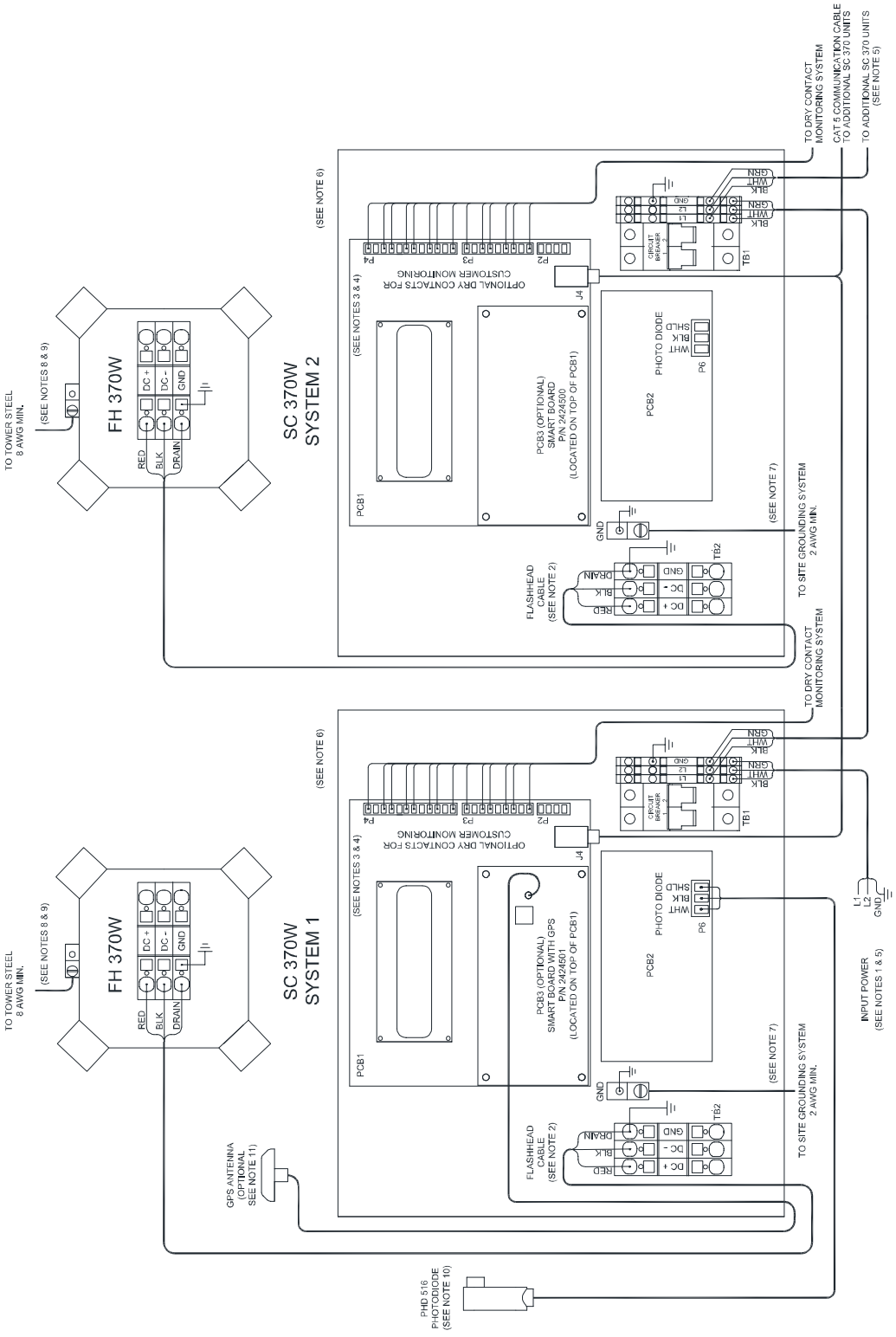


Figure 2-21 – Typical D1 & D2 System Wiring Diagram

System Wiring Diagram Notes (D1 & D2)

1. Input power conductor size depends on the service voltage, the distance from the source, and number of SC 370 units connected. Assume 340 VA per SC 370. Also see Note 5.

2. Use only Flash Technology PN 4210000, 4370000, or 4206000 to connect the flashhead to the SC 370. Splicing of the cable is not permissible on D1 and D2 systems. A 5' service loop should be placed at the base of the tower near the controller and just below the flashhead. The cable should be secured to the structure using the 2/3/4 method. See "Securing The Cable" (this section).

3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.

4. User's alarm circuit not shown.

5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 370 programmed as System 1. It is also recommended to daisy chain the input power connection from System 1 TB1 L1 and L2 (AC units) or + and – (DC units) to System 2 TB1 input and to continue the input power distribution in this manner between remaining units.

Note: The Circuit Breaker terminals of TB1 should not be used to supply power to other units.

6. Mount the enclosures vertically.

7. The SC 370 enclosure must be grounded to the site grounding system using 2 AWG wire minimum.

8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36" above the height of the flashhead and a minimum of 18" horizontally away from the flashhead.

9. The FH 370(s) must be grounded to tower steel using 8 AWG wire minimum. It is recommended that all exposed ground connections are coated with a corrosion inhibitor (NO-OX or equivalent).

10. The photodiode must be mounted vertically, outdoors facing an unobstructed polar sky. It must not view direct or reflected artificial light. The photodiode may be mounted at the top end of a vertical length of rigid conduit or to the optional Antenna Mounting Bracket kit (P/N 1905355). The photodiode cable may be spliced to provide additional length.

11. Mount the GPS antenna outdoors with an unobstructed view of the sky. Antenna Mounting Bracket kit (P/N 1905355) is recommended for installation of the GPS antenna.

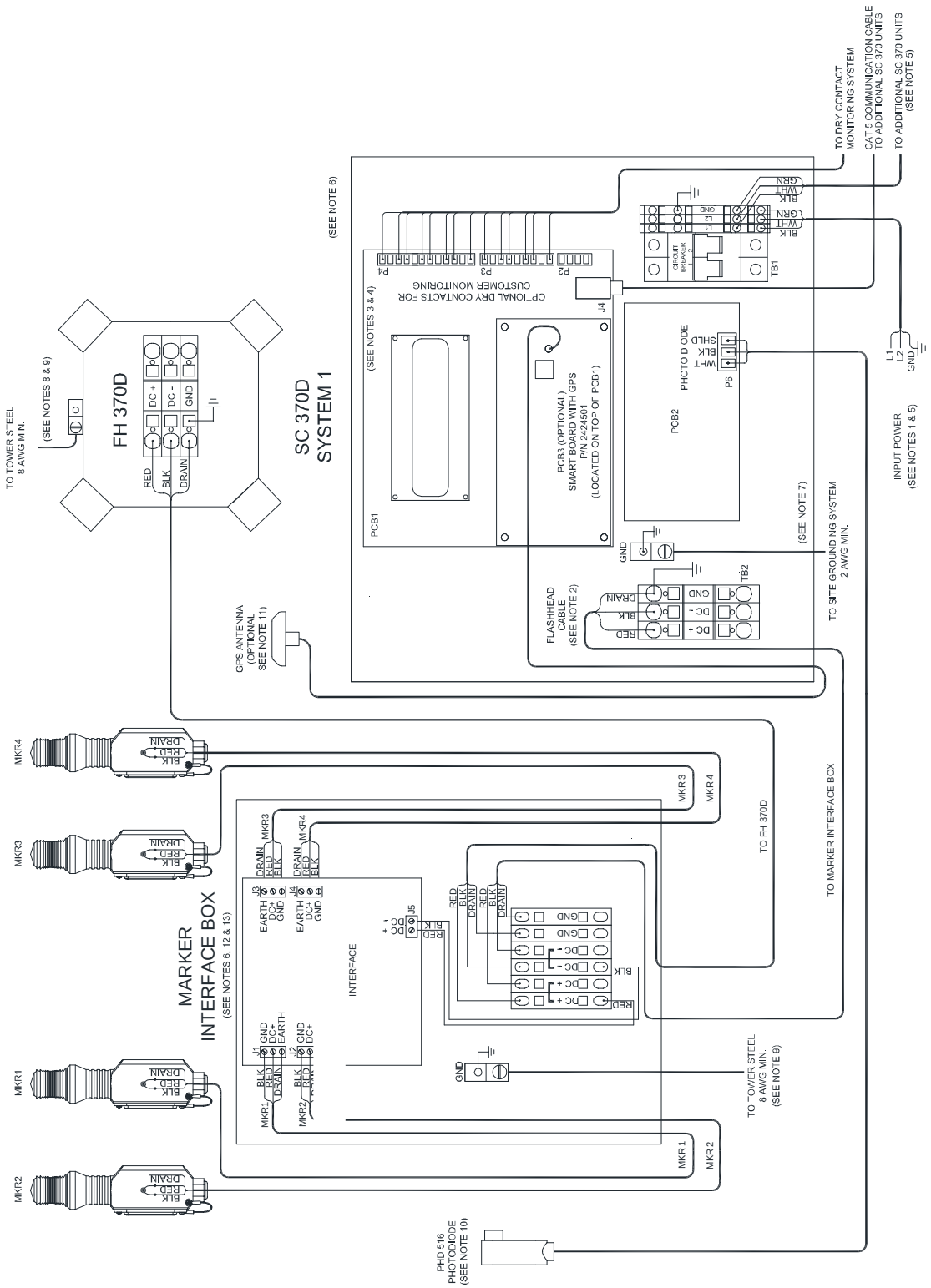


Figure 2-22 – Typical E1 & E2 System Wiring Diagram

System Wiring Diagram Notes (E1 & E2)

1. Input power conductor size depends on the service voltage, the distance from the source, the number of SC 370 units connected and number of L-810 marker lights served. Assume 340 VA per SC 370. Also see Note 5.

2. Use only Flash Technology PN 4210000, 4370000, or 4206000 to connect the flashhead to the SC 370. Splicing of the cable is permissible only at the marker interface box (if installed). A 5' service loop should be placed at the base of the tower near the controller, just below the flashhead and above and below the marker interface box (if installed). The cable should be secured to the structure using the 2/3/4 method. See "Securing The Cable" (this section).

3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.

4. User's alarm circuit not shown.

5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 370 programmed as System 1. It is also recommended to daisy chain the input power connection from System 1 TB1 L1 and L2 (AC units) or + and – (DC units) to System 2 TB1 input and to continue the input power distribution in this manner between remaining units.

Note: The Circuit Breaker terminals of TB1 should not be used to supply power to other units.

6. Mount the enclosures vertically.

7. The SC 370 enclosure must be grounded to the site grounding system using 2 AWG wire minimum.

8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36" above the height of the flashhead and a minimum of 18" horizontally away from the flashhead.

9. The FH 370(s) and Marker Interface Box(es) must be grounded to tower steel using 8 AWG wire minimum. It is recommended that all exposed ground connections are coated with a corrosion inhibitor (NO-OX or equivalent).

10. The photodiode must be mounted vertically, outdoors facing an unobstructed polar sky. It must not view direct or reflected artificial light. The photodiode may be mounted at the top end of a vertical length of rigid conduit or to the optional Antenna Mounting Bracket kit (P/N 1905355). The photodiode cable may be spliced to provide additional length.

11. Mount the GPS antenna outdoors with an unobstructed view of the sky. Antenna Mounting Bracket kit (P/N 1905355) is recommended for installation of the GPS antenna.

12. Voltage drop to the L-810 markers must not exceed 3% of the rated voltage.

13. **Mount the Marker Interface Enclosure at the marker tier level**. A pictorial detailing the mounting of the Marker Interface Enclosure is included with the Marker Kit installation instructions (P/N 7790107 or 7790108). Refer to "Vanguard® Marker Installation" (P/N 7904214) for specific information regarding cable connection to the MKR 371.

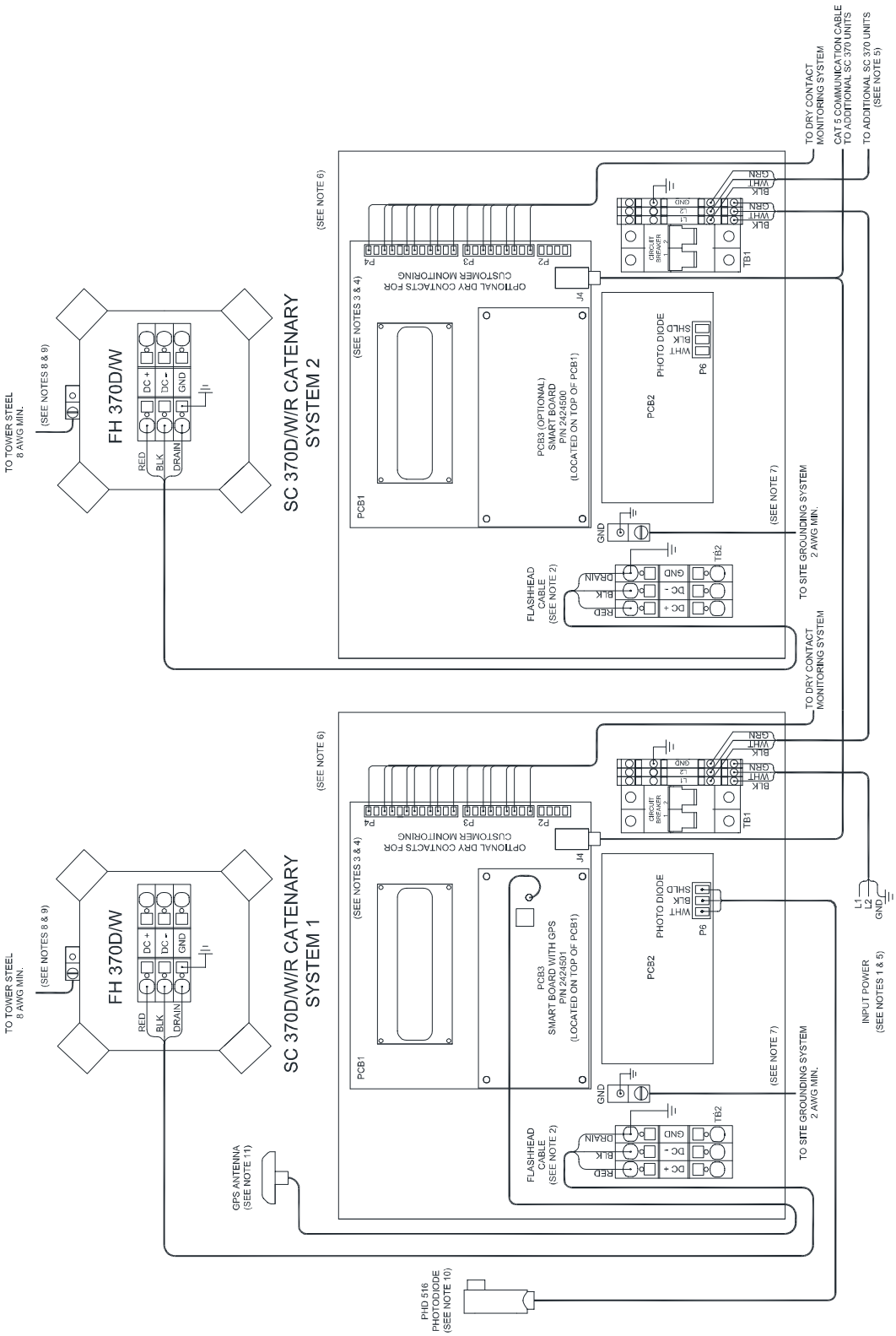


Figure 2-23 – Typical Catenary System Wiring Diagram

System Wiring Diagram Notes (Catenary)

1. Input power conductor size depends on the service voltage, the distance from the source, and number of SC 370 units connected. Assume 340 VA per SC 370. Also see Note 5.

2. Use only Flash Technology PN 4210000, 4370000, or 4206000 to connect the flashhead to the SC 370. Splicing of the cable is not permissible on Catenary systems. A 5' service loop should be placed at the base of the tower near the controller and just below the flashhead. The cable should be secured to the structure using the 2/3/4 method. See "Securing The Cable" (this section).

3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.

4. User's alarm circuit not shown.

5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 370 programmed as System 1. It is also recommended to daisy chain the input power connection from System 1 TB1 L1 and L2 (AC units) or + and – (DC units) to System 2 TB1 input and to continue the input power distribution in this manner between remaining units.

Note: The Circuit Breaker terminals of TB1 should not be used to supply power to other units.

6. Mount the enclosures vertically.

7. The SC 370 enclosure must be grounded to the site grounding system using 2 AWG wire minimum.

8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36" above the height of the flashhead and a minimum of 18" horizontally away from the flashhead.

9. The FH 370(s) must be grounded to tower steel using 8 AWG wire minimum. It is recommended that all exposed ground connections are coated with a corrosion inhibitor (NO-OX or equivalent).

10. The photodiode must be mounted vertically, outdoors facing an unobstructed polar sky. It must not view direct or reflected artificial light. The photodiode may be mounted at the top end of a vertical length of rigid conduit or to the optional Antenna Mounting Bracket kit (P/N 1905355). The photodiode cable may be spliced to provide additional length.

11. Mount the GPS antenna outdoors with an unobstructed view of the sky. Antenna Mounting Bracket kit (P/N 1905355) is recommended for installation of the GPS antenna.

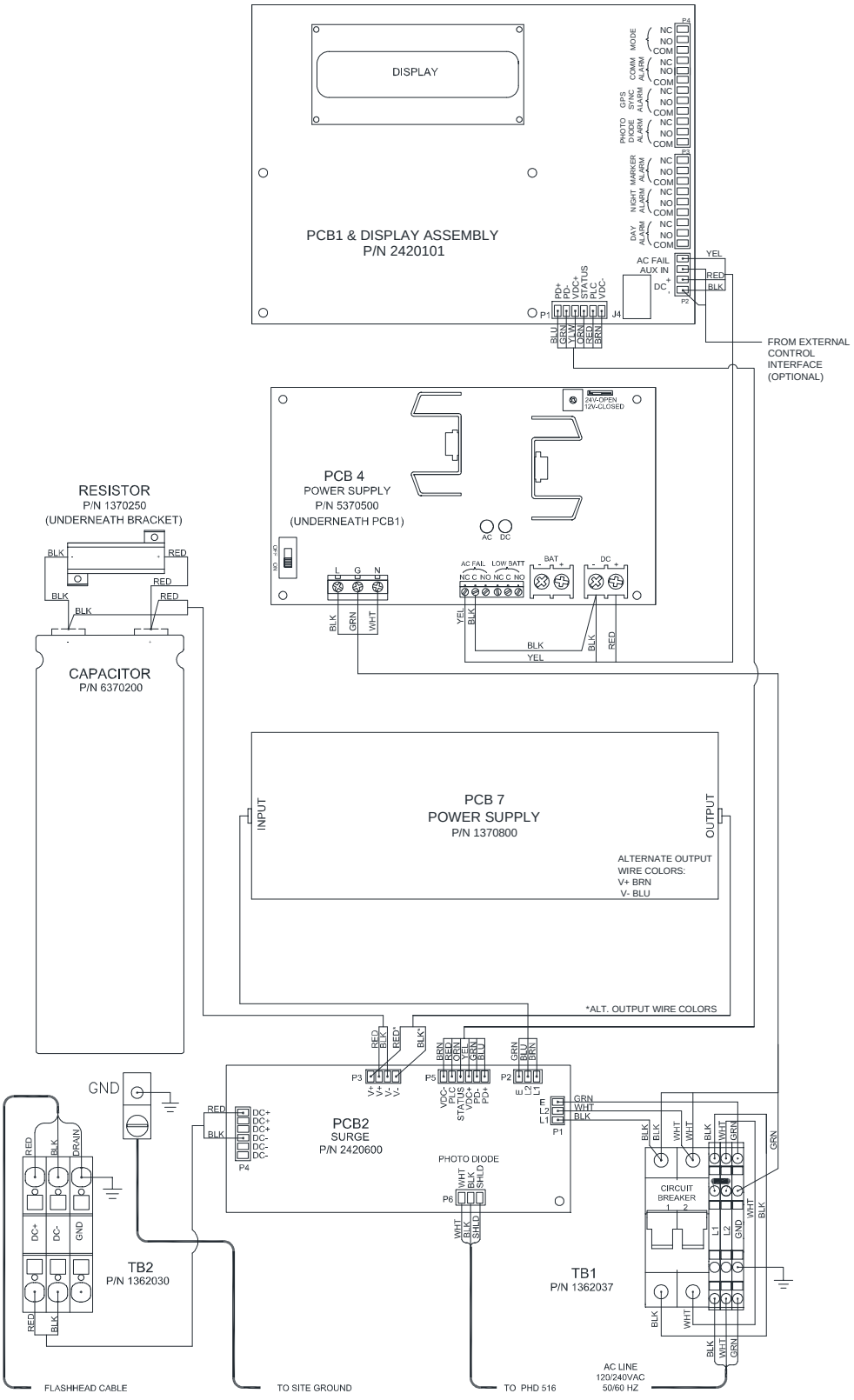


Figure 2-24 – SC 370 (AC) Internal Wiring
Standard System

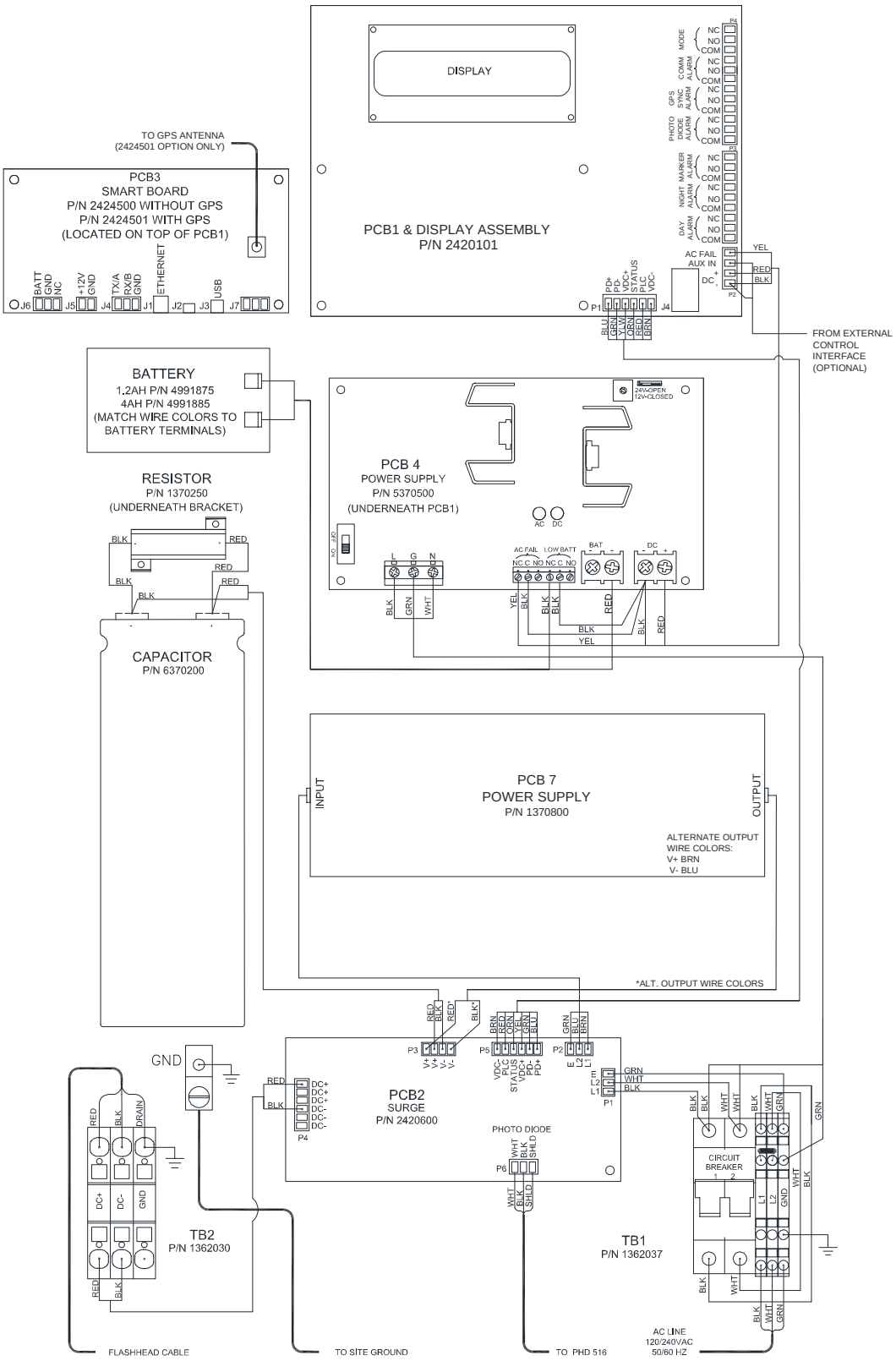


Figure 2-25 – SC 370 (AC) Internal Wiring
with Smart Board Option

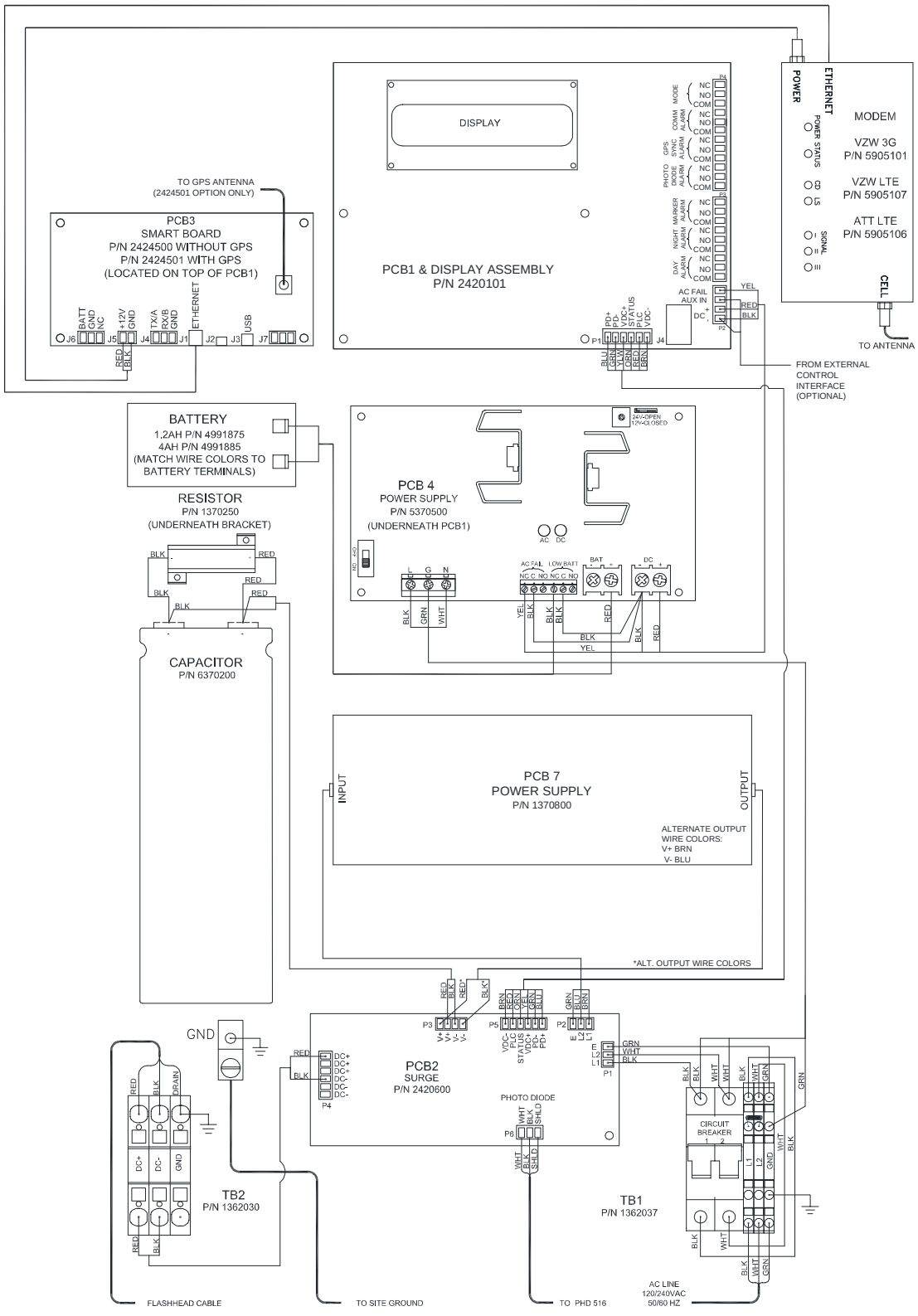


Figure 2-26 – SC 370 (AC) Internal Wiring
with Modem Options

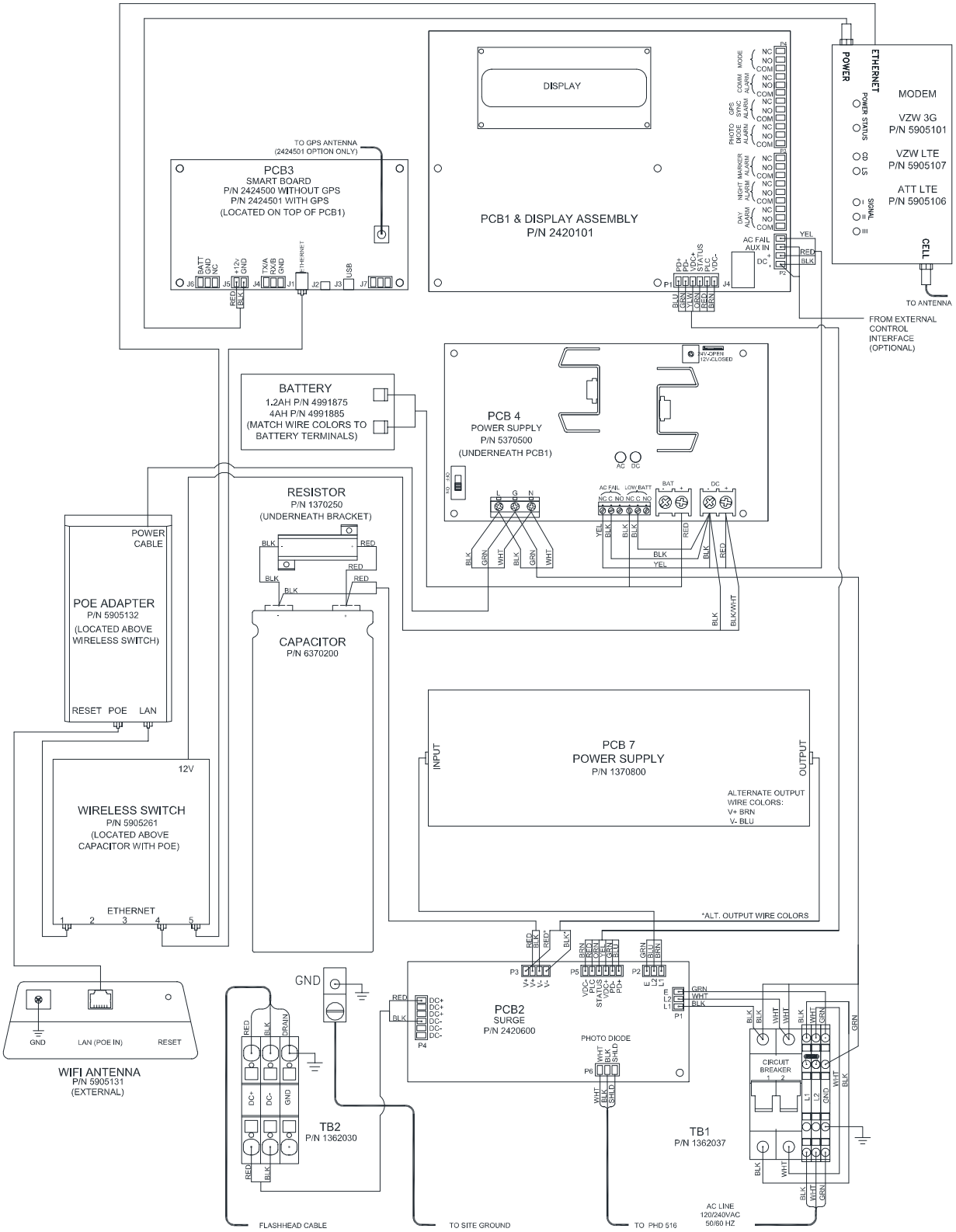


Figure 2-27 – SC 370 (AC) Internal Wiring
with Modem & Wi-Fi Options

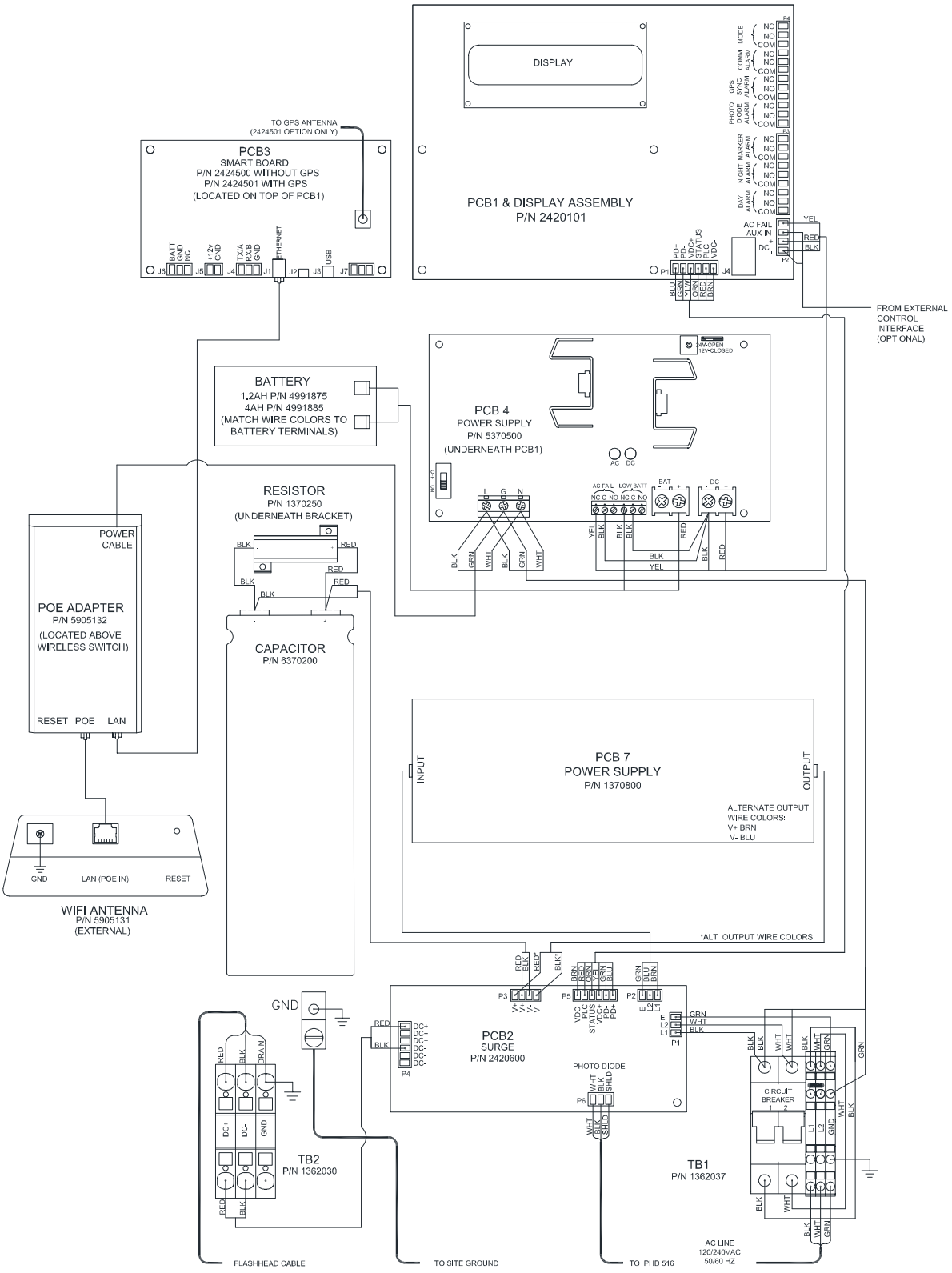


Figure 2-28 – SC 370 (AC) Internal Wiring
with Wi-Fi Option

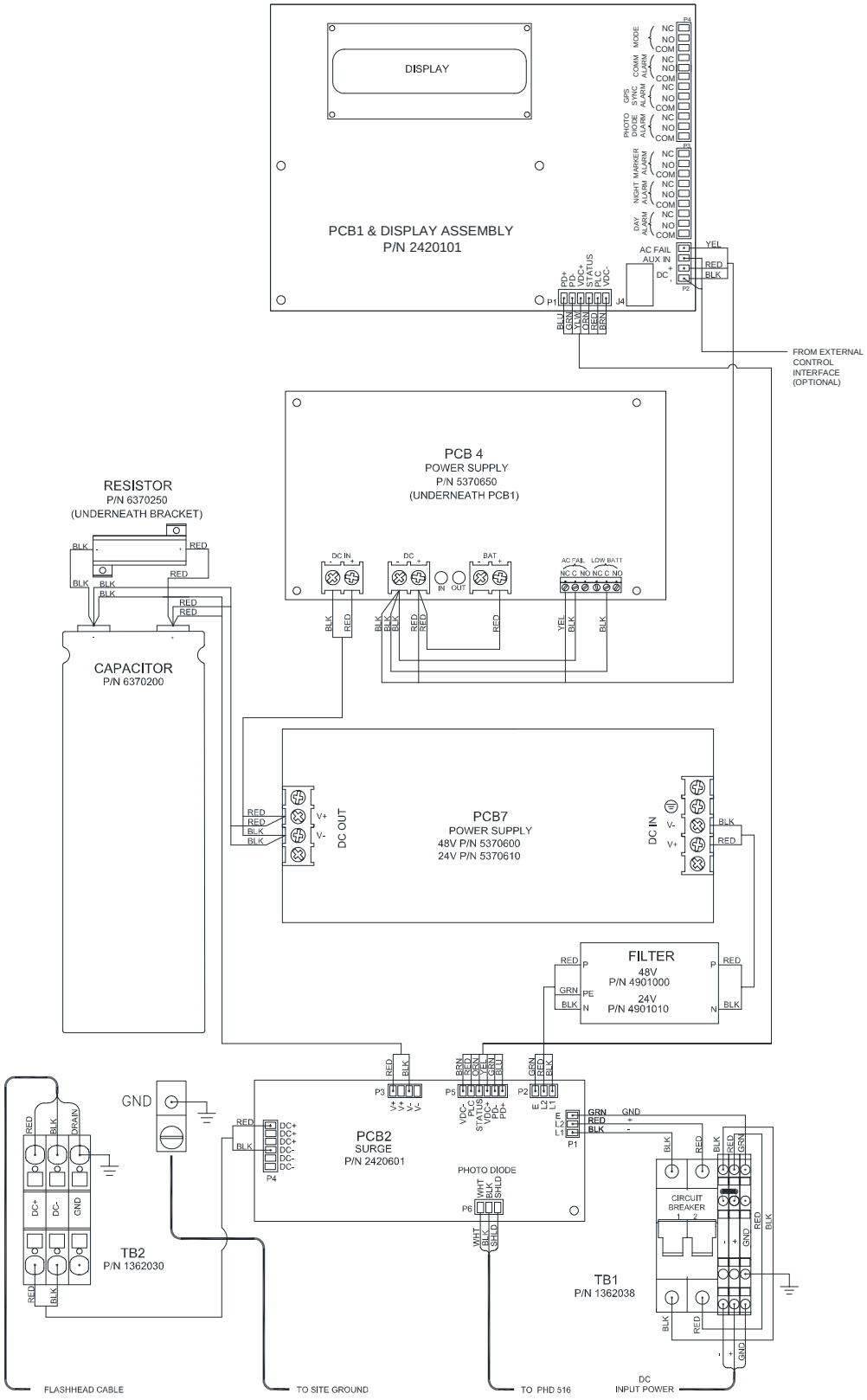


Figure 2-29 – SC 370 (DC) Internal Wiring
Standard System

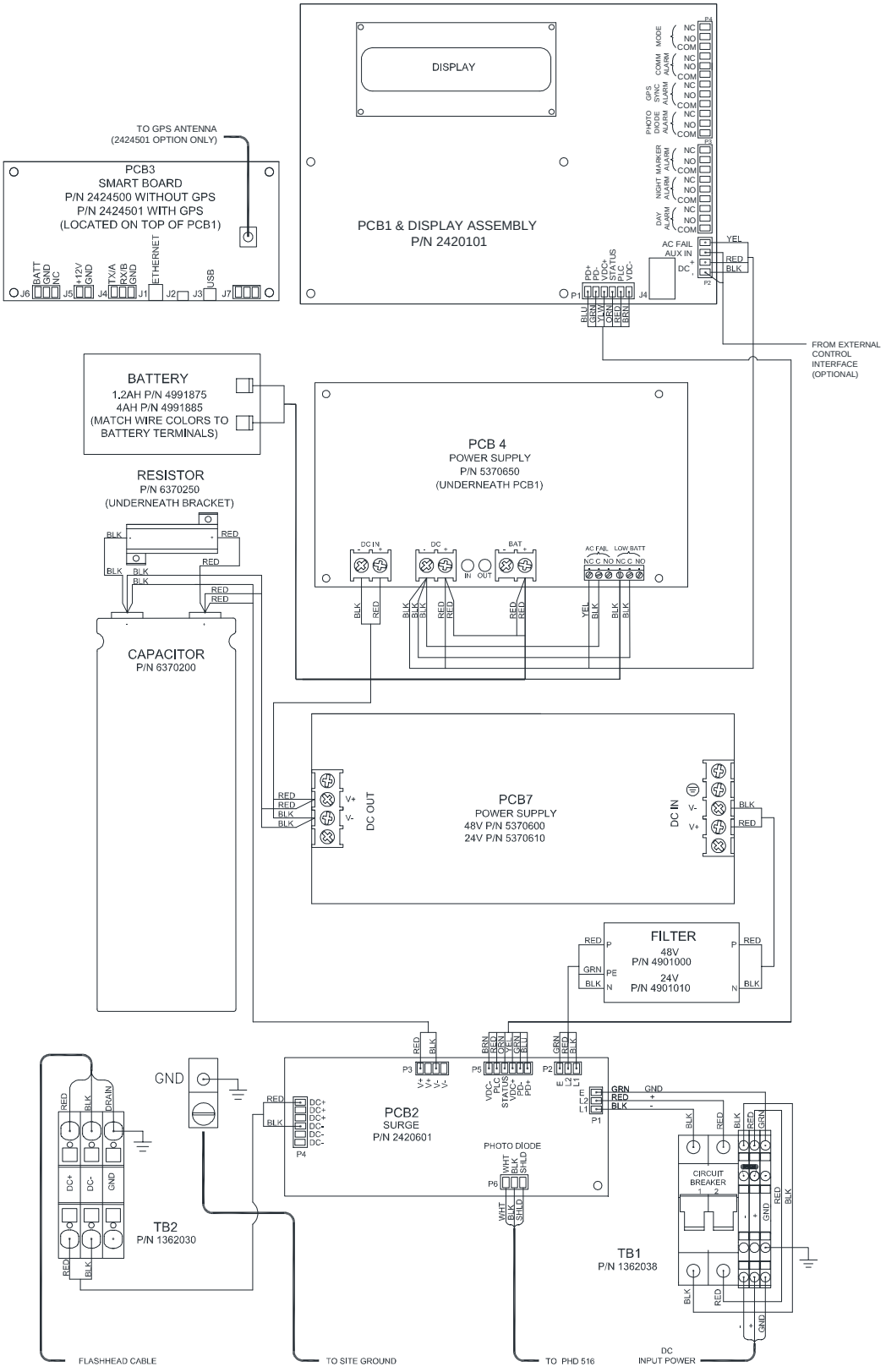


Figure 2-30 – SC 370 (DC) Internal Wiring
with Smart Board Option

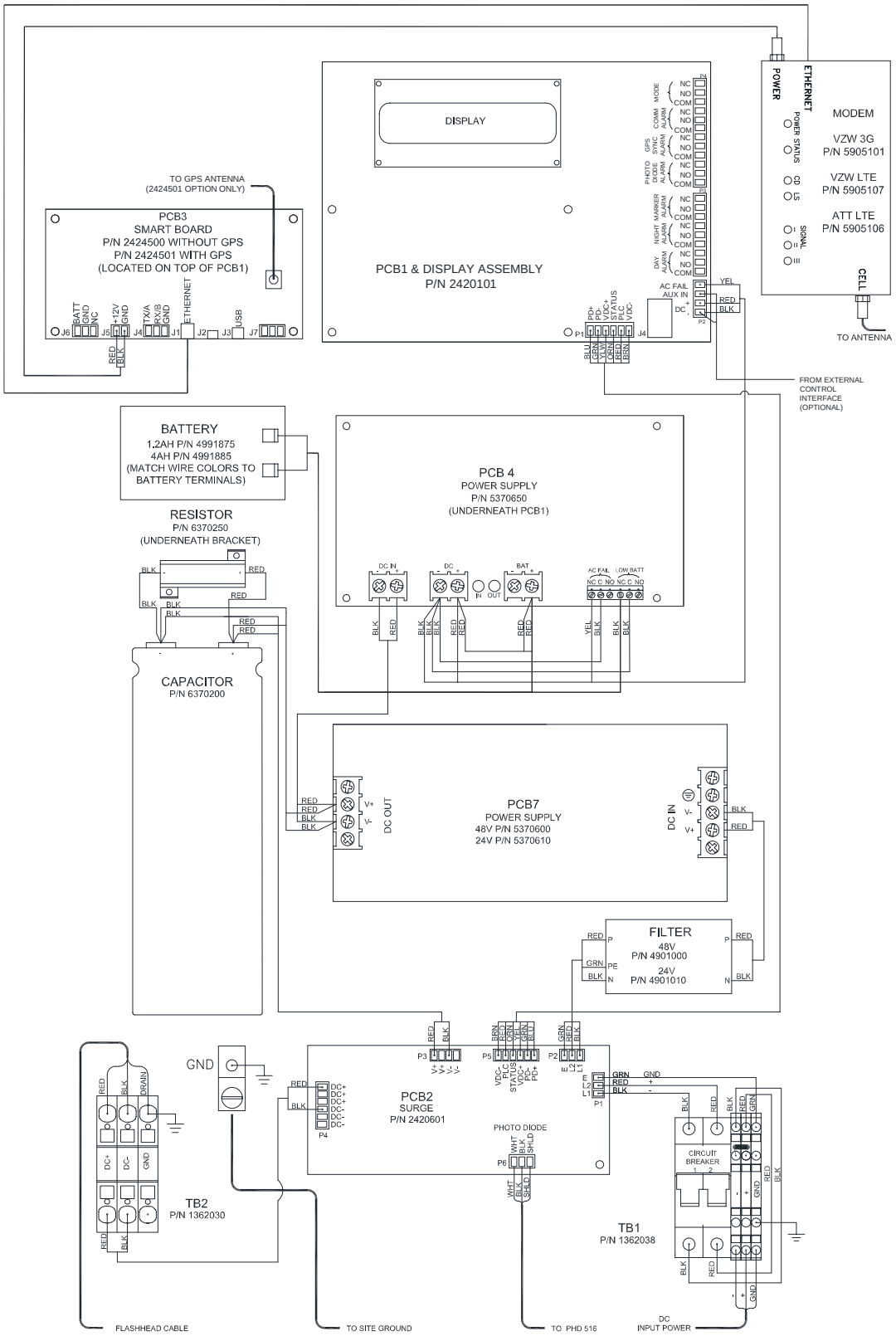


Figure 2-31 – SC 370 (DC) Internal Wiring
with Modem Option

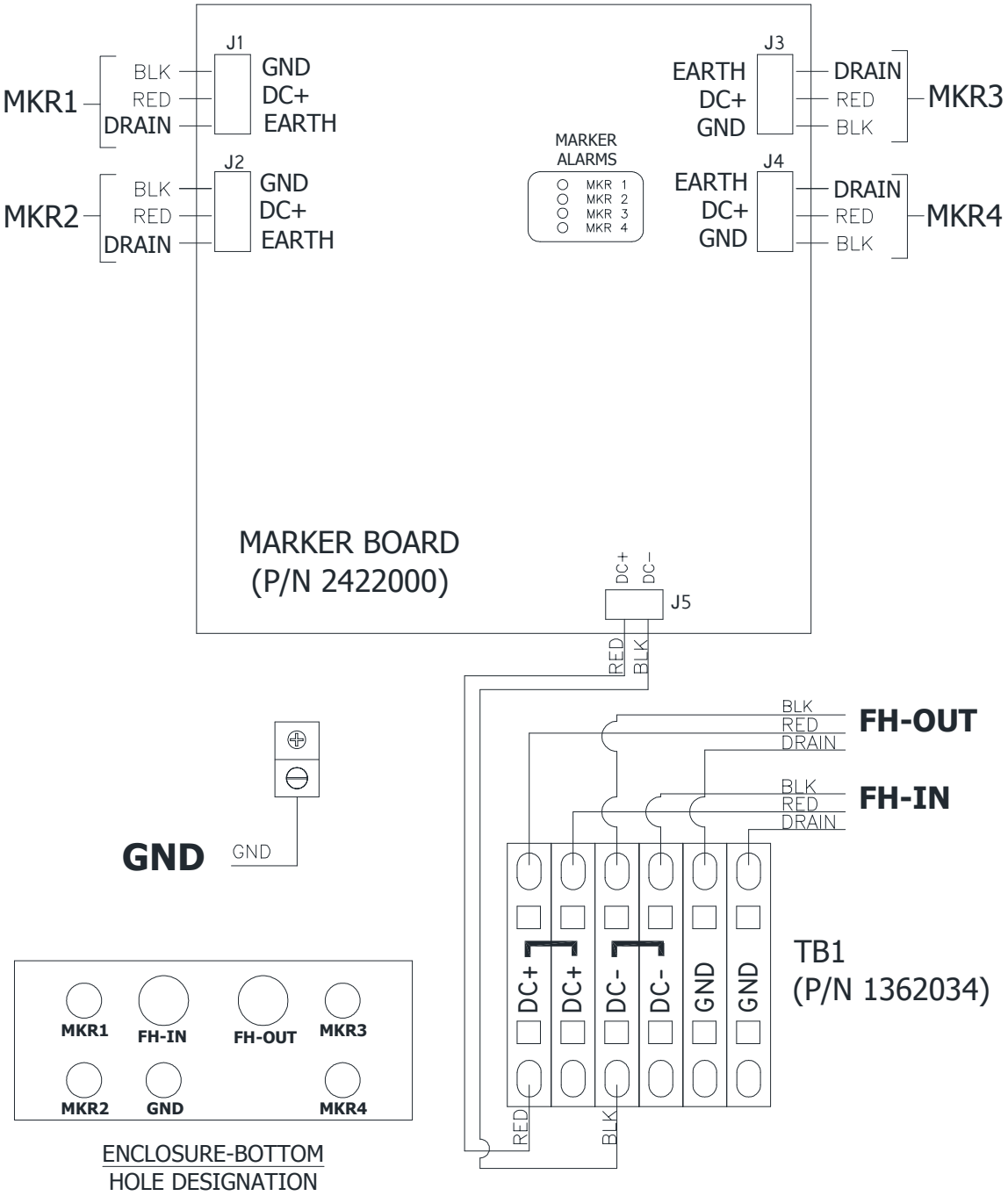


Figure 2-32 – Marker Interface Enclosure Wiring Diagram

Section 3 – Information Display

Navigating the Information Display

Three pushbuttons to the right of the information display provide access to navigate the system menus, configure the system and review diagnostic information.

Table 3-1 describes the function of each button. The top level menu is described in Table 3-2. Each menu option is discussed in the headings following Table 3-2.

Figure 3-1 – Information Display

Table 3-1 – Controller Display Buttons [1]

Button	Function
S1 UP ⬆	Navigates UP through the active menu options.
S2 ENTER	Confirms your selection or Advances to the NEXT option. Press and hold for 1.5 seconds then release to return to the previous menu. Press and hold for longer than 5 seconds to return to the main menu.
S3 DOWN ⬇	Navigates DOWN through the active menu options.

Table 3-2 – Top Level Menu Options [1]

Menu Option	Description
CONTROL TYPE	Selects the role of the unit as System 1 or subordinate System 2-6
SITE TOWER CONFIG	Selects the overall system configuration. (System 1 only)
LOCAL TOWER CONFIG	Selects the individual unit configuration.
MONITORING CONFIG	Selects the type of monitoring equipment that will be used to monitor the system. (System 1 only)
MONITORING STATUS	Provides status of the built in monitoring system. (System 1 only)
LOCAL DIAGNOSTICS	Displays the firmware revision and multiple analog values for the controller, beacon and markers. This menu is especially helpful when troubleshooting the system.
LIGHTING INSPECTION (LI)	Allows the user to perform a lighting inspection. Automatic and Manual modes are available.
MODE OVERRIDE	Allows the system to be manually placed in any capable mode for a user definable period of up to 24 hours.
FACTORY TEST	Factory use only.
SYSTEM SETTINGS	Allows the user to reboot the system without physically interrupting input power or to restore configuration settings to factory default values.
FACTORY DIAGNOSTICS	Factory use only.
SYSTEM X FIRMWARE [2] (System 1 only)	This feature allows System 1 to display, and if appropriate, upgrade the firmware version of each connected subordinate unit to its current version. [2]

1. Menu options and features are based on firmware version 3.1.
2. Subordinate units must have firmware Version 3.0 or higher installed to receive firmware upgrade from System 1.

Ctrl Type

Control Type allows any SC 370 in the system to be designated as the controlling unit for the entire system. The programming options are "System1" – "System 6". System 1 is designated as the control unit and the remaining units are subordinate. Each unit must have a unique address. Typically, an uppermost flashhead is connected to the unit programmed as System 1. **The photodiode is always connected to the unit designated as System1.**

- Press the ENTER button to activate the programming menu.
- Press the down arrow to move the * to CTRL TYPE and press the ENTER button to display the System Number menu.
- Use the DOWN button to move the * to the desired system number (1 – 6) and press ENTER to select.
- The system will return to the home menu automatically after a selection is made.

  Note: Use the UP or DOWN buttons to move the * to BACK and press ENTER to return to the home menu if no selection is made.
- Press the DOWN button to move the * to the next programming option and press enter.

Note: The input and selection methods for the remaining menu options are the same as listed above. Only the menu will be listed for the remaining headings.

Site Tower Config

The Site Tower Configuration menu is only available on the unit programmed as System 1. This menu enables programming of the lighting type, total quantity of beacons installed, flash rate and the marker operation as flashing or steady. Optional GPS synchronization and delay programming are provided in this menu as well.

Important! The Site Tower Configuration must be programmed to match the FAA designated lighting system type for the structure.

Marker Mode

Marker mode allows the L-810 markers to be programmed as steady burning or flashing. If the flashing option is selected, the markers will flash in synchronization with the beacon(s).

Red Flash Mode

Red Flash Mode provides two options: Efficiency and Legacy. Efficiency mode has a shorter flash duration and uses less overall energy. Legacy produces a longer flash duration that resembles the output of an incandescent lighting system. Both modes have an output of 2,000 ECD as required by the FAA. Efficiency is recommended for most system installations. Legacy is recommended if the lighting system will be required to synchronize with previous generation Flash Technology lighting systems on nearby towers.

GPS Sync

GPS Sync allows the FTS 370 system to wirelessly synchronize with other lighting systems without regard to distance. GPS Delay adds the flexibility to synchronize with lighting systems from other manufacturers by adding an adjustable delay (0 - 3000 ms) to the flash output.

Catenary

Catenary lighting systems require three levels (tiers) of lights. Therefore, a minimum of three SC 370 power and control units and associated flashheads are required for catenary operation. Catenary position programming is located in the Local Tower Configuration menu. At least one unit must be programmed for each of the following positions: top, middle and bottom.

> **Note:** The catenary flash pattern is: middle - top - bottom.

Dry Contacts

Dry contact monitoring is available regardless of any additional method selected to monitor the system. The options available in the Dry Contacts submenu are: Combined and Separate.

Selecting the Combined option allows dry contact information from subordinate units to be sent to System 1. The corresponding dry contact alarm on System 1 will be activated. This method is typically selected when the monitoring system has a limited number of inputs available.

Selecting the Separate option localizes the alarm to the affected unit. Each alarm point in the system can be monitored individually. This is the preferred method when using dry contacts to monitor the system.

Disarm Photodiode Alarm

Disarm Photodiode Alarm inhibits the system's 19 hour mode timer from generating a photodiode alarm. This feature is particularly useful in areas that are prone to periods of light or darkness that would exceed the 19 hour mode timer. To activate this feature, select "ON" in the menu.

> **Note:** The 19 hour mode timer is intended to provide notification of a possible failure in the system. The disarm feature should only be activated if the system is installed in a location prone to conditions previously described. Verify that the photodiode is installed and functioning correctly before selecting this option.

Auxiliary Input

The Auxiliary Input allows an external device, such as a radar system, to inhibit the output of the beacon. Control via the Auxiliary Input is limited to systems consisting of a single SC 370 power and control unit. Connections for the Auxiliary Input are discussed in Section 1 "P2 Auxiliary Input" and shown in Figures 2-24 – 2-31. A description of each Auxiliary Input menu option is described in the following bullet points:

- **Help** provides a description of the Auxiliary Input menu.
- **Command Status** indicates the current mode (On or Off) being commanded by the external control device.
- **Control Type** sets the type of input for the external control device. Options in the Control Type menu are: Disabled (external control not activated), Modbus (Technical Bulletin "SC 370 SMART Modbus interface" (part number 7904502)) and Dry Contact (contact closure required to inhibit light output).
- **Confirm Output Configuration** allows any alarm contact to be "reassigned" to indicate that the system is operating normally while the flash is inhibited.
- **Heartbeat** used only when Auxiliary Input is controlled by Modbus to provide a fail-safe in the event of a communications failure between the SC 370 and the external control device.

IR Enable

This option allows the system to enable or disable IR (Infrared) output of IR capable beacons. Verify that the beacon(s) is an FH 370d IR before enabling this option.

Note: IR Enable must be set to "Yes" for IR operation on FH 370d IR. See Section 1 FH 370d/w/r for additional information regarding IR.

Markers Enabled

This option allows the system to disable markers without generating configuration alarms and the markers will be turned off on all the systems. Also markers per tier value will be set to zero on all the systems.

IR Is Night Alarm

When set to "Yes", a detected malfunction in the IR circuit of the FH 370d IR will be treated as a night alarm. When set to "No", only an "IR Alarm" is generated and no dry contacts are activated.

Note: It is recommended that the IR Is Night Alarm is set to "Yes" for systems monitored by dry contacts.

Site Tower Configuration (System 1 only)	Tower Type		Red		
			White		
			Dual		
	Number of Beacons [1]		1 – 6		
	Marker Mode [2]		Steady		
			Flashing		
	Red Flash Mode [3]		Efficiency		
			Legacy		
	Flashes Per Minute Red [4]		20 FPM		
			30 FPM		
			40 FPM		
	GPS SYNC		Enable/Disable		
	GPS Delay [5]		Load Default Value	Yes /No	
				Yes Confirm?	
			0000 ms Valid Range 0-3000		
	Catenary [3]		Yes /No		
	Dry Contacts		Combined		
			Separate		
	Disarm PD (Photodiode) Alarm[6]		On /Off		
	Auxiliary Input [7]	Help	A Secondary System Can Use The Auxiliary Input To Command Lights On/Off.		
		Command Status	On /Off		
		Control Type	Help	Auxiliary Input Can Be Controlled By Either Modbus Or Dry Contact, But Not Both.	
			Disabled		
			Modbus		
			Dry Contact		
		Confirm Output Configuration	Help	Choose Which Dry Contact Output To Override With Auxiliary Input Lights On/Off Command Confirmation.	
			Disabled		
			Mode Status		
			Comm Alarm		
			GPS Sync. Alarm		
			Photodiode Alarm		
			Marker Alarm		
			Night Alarm		
			Day Alarm		
		Heartbeat [8]	Range Is 0 – 65535 (Value 100 = 10.0s)		
	IR Enable[3]		Help	To enable infrared beacon, the beacon must support IR.	
			Yes/No		
	IR Is Night Alarm		Help	When selected, an IR alarm will also cause a night alarm.	
			Yes/No		
	MKRS Enabled		Help	When no is selected, markers will be turned off and no config alarm will be triggered.	
			Yes/No		

1. Must be set to "1" when using Auxiliary Input.
2. If "Flashing" is selected, the markers will flash in synchronization with the beacon.
3. "Legacy" mode is operational only when 20 FPM is selected. Red Flash Mode selection is overridden in Catenary mode or when 30/40 FPM is selected. IR beacons ignore "Legacy" mode.
4. Beacon will flash in "Efficiency" or "Legacy" mode when 20 FPM is selected. Beacon will only flash in "Efficiency" mode when 30 or 40 FPM is selected.
5. GPS SYNC must be Enabled for GPS Delay menu option to be displayed.
6. The 19 hour mode timer is intended to provide notification of a possible failure in the system. The disarm feature should only be activated if the system is installed in a location prone to periods of light or darkness that would exceed the 19 hour mode timer.
7. Feature available in Firmware V2.9 and above. "Number Of Beacons" must be set to 1.
8. Used only when Auxiliary Input is controlled by Modbus to provide a fail-safe in the event of a communications failure between the SC 370 and the external control device.

Note: Verify that the lighting system is programmed to operate as described by the FAA determination for the structure.

Local Tower Config

The Local Tower Configuration menu simplifies system installation by allowing each SC 370 to discover and bind with its connected external components. The binding process allows the controller to assign an address to each of the connected external components without the need to manually address dipswitches or configure jumpers. Additional programming options in this menu include: AOL beacon selection, Catenary level selection and L-810 marker programming.

Bind Tower

The binding procedure is **required** for systems consisting of two or more SC 370 units or any GPS enabled system. The binding procedure is not required, but is **highly recommended** for single SC 370 systems. The procedure must be performed during initial system installation and when control components are replaced. **Please familiarize yourself with the following steps before performing this procedure.**

1. Remove power from the lighting system at the source.
2. Measure the output voltage on each SC 370 unit at TB2 DC+ and DC-. Verify that the voltage is less than 5V DC before proceeding.
3. Select the SC 370 unit for the binding procedure. Flip Circuit Breaker switch with Flag Indicator to green OFF located on TB1 of all other SC 370 units in the system.
4. Restore the source power to the lighting system with Flag Indicator to red ON. Only the SC 370 unit selected in the previous step should be operational.
5. Select Bind Tower in the Local Tower Configuration menu and follow the on-screen instructions.
6. All discovered connected components will be displayed at the bottom of the screen. Press Enter to accept. Move the * to Yes and press Enter two times to confirm the binding procedure.
7. Repeat the procedure for all remaining SC 370 units in the system.

Unbind Tower

If an error occurs during the binding procedure or a control component is replaced, you must use the Unbind Tower option to remove the previously assigned address. Follow the steps in the Unbind menu option. The Bind Tower procedure must be repeated after the Unbind Tower request is completed.

AOL Beacon

Dual lighting systems require that the malfunction of any uppermost red beacon place the entire system in white night backup. The AOL Beacon option allows the uppermost beacons to be programmed to meet this requirement. All SC 370 units connected to an uppermost beacon must be programmed as AOL beacon.

Marker Settings

The Marker Settings menu provides access to program the total number of L-810 markers connected to each SC 370 unit. Additionally, each marker's power consumption can be manually or automatically sensed and a normal operating threshold established. This feature helps to ensure the system's compatibility with future marker designs. It also simplifies the replacement of marker fixtures by allowing different models of Flash Technology approved markers to be installed in the same system.

Local Tower Configuration	Bind State	Bound/Unbound (Status Only)	Beacon	
	Bind Tower	Please Ensure All Other Systems Are Turned Off. Then Press Enter…		
		Verify All Disabled Systems Twr Pwr Is Less Than 5V. Then Press Enter		
		Accept		
		Cancel	Yes /No	
			Yes Confirm?	
		Binding…	Beacon Marker	
	Unbind Tower	Yes /No		
		Yes Confirm?		
	Markers Settings	Markers Per Tier [2]	Marker Tier Not Present	
			0 - 4	
		Threshold In Use	Output # (1-X): XXXXXXXX	
		Load Threshold Default	Yes /No	
			Yes Confirm?	
		Threshold Auto Sense	Auto Sense All	Auto Sensing
				Output # (1-4): XXXXXXXX
			Auto Sense Output (1-X)	Auto Sensing
				Output # (1-4): XXXXXXXX
		Threshold Manual	Output # (1-4): XXXXXXXX	
			Enter Range (0 - 99999999)	
	AOL Beacon [1]	Yes /No		
	Catenary Level [3]	Middle / Top / Bottom		
	Beacon Enable	Help	When no is selected, beacon will be turned off and no communication alarm will be triggered.	
		Yes/No		

1. All uppermost beacons in a dual system must be programmed as “AOL Beacon”.
2. Marker Tier Not Present should be selected if the Site Tower Configuration is programmed for Catenary. A configuration alarm will be generated if a number (1-4) is selected. Selecting 0 will turn off markers without generating a configuration alarm.
3. Catenary Level menu option is only available if the Site Tower Configuration is programmed for Catenary.

Monitoring Config

The Monitoring Configuration option is only available on the unit programmed as System 1. This option selects the type of monitoring for the system. The options include Local Ethernet Configuration, Primary Data Monitoring and Alternate Data Monitoring.

Note: Dry contact monitoring is available regardless of any additional method selected to monitor the system.

Local Ethernet Configuration

The options available in the Local Ethernet Configuration provide a way to configure System 1 to properly operate on the connected network.

When System 1 utilizes a cellular modem the settings should be as follows:

IP Address Mode: Static
IP Address: 192.168.1.11
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.1.10
The MAC Address is not editable.

Primary Data Monitoring

The options available in the Primary Data Monitoring submenu are: Disabled, Cellular Eagle 2.0, RS 485 Modbus RTU, Ethernet SNMP, Ethernet Modbus (RTU / TCP) and Ethernet Eagle 2.0. A brief description of the application for each method is listed in the following bullet points:

- **Cellular Eagle** - selected when the system is purchased with a cellular modem and will be monitored by the Flash Technology NOC.

- **RS 485 Modbus RTU** - used to connect via serial cable to an external monitoring device on site that supports Modbus protocol.

- **Ethernet SNMP** - used to connect via Ethernet to a server that is able to monitor SNMP traps.

  Note: See Technical Bulletin "SC 370 SNMP Trap Interface" (part number F7904503) for complete a complete SNMP trap list.

- **Ethernet Modbus (RTU / TCP)** - used to connect via Ethernet to an external monitoring device on site or to a server connected to the network that is able to monitor Modbus devices.

  Note: See Technical Bulletin "SC 370 SMART Modbus interface" (part number F7904502) for complete Modbus specifications and map.

- **Ethernet Eagle** - selected when the system is purchased with a Smart Board only and will be monitored through a customer supplied Ethernet connection by Flash Technology's NOC.

  Note: A static, public IP address is required. Network support will be necessary on the customer supplied connection and equipment.

Alternate Data Monitoring

Alternate Data Monitoring allows for a secondary monitoring method. All options available in the Primary Data Monitoring menu are available in the Alternate Data Monitoring menu.

Note: Monitoring Options are mutually exclusive. Example: If RS 485 Modbus RTU is selected in either menu, it is removed from the available options in the other menu.

Ethernet SNMP, if used, must be selected as the Primary Data Monitoring method.

Monitoring Configuration (System 1 Only)	Load Factory Default		Yes /No	
			Yes Confirm?	
			Default of Primary / Alternate Monitoring	
	Local Ethernet Configuration		IP Address Mode	Static
				Dynamic
			IP Address	XXX.XXX.XXX.XXX
			Subnet Mask	XXX.XXX.XXX.XXX
			Default Gateway	XXX.XXX.XXX.XXX
			MAC Address	XXXXXXXXXXXX
			Commit Settings	Yes /No
				Yes Confirm?
	Primary Data Monitoring	Monitoring Method: Disabled		
		Monitoring Method: Cellular Eagle 2.0	Autoupdate: XX Hours - XX Minutes	Hours (Enter Value Ranging From 0 - 24)
				Minutes (Enter Value Ranging From 0 - 59)
			Primary Server IP Address (Enter IP Address)	
			Primary Server Port 54630	
			Alternate Server IP Address (Enter IP Address)	
			Alternate Server Port 54630	
			Listen Port 54631	
			Sim Card: (AT&T Direct, AT&T ROW, AT&T ROW2 or Customized)[1]	Select AT&T Direct (SIM is Blue/White Front, Orange Back)
				Select AT&T ROW (Rest Of World) (SIM Is Solid White)
				Select AT&T ROW2 (Rest Of World 2) (SIM Is Solid White)
				Select Customized if you know your APN and are connecting to a third party NOC
		Monitoring Method: RS 485 Modbus RTU	Autoupdate: Disabled	
			Baud Rat: 9600	
			Station Address: Default is 2 (Enter Value Ranging From 0 – 255)	
		Monitoring Method: Ethernet SNMP[2]	Autoupdate: XX Hours - XX Minutes	Hours (Enter Value Ranging From 0 - 24)
				Minutes (Enter Value Ranging From 0 - 59)
			Primary Server IP Address (Enter IP Address)	
			Primary Server Port (Enter Port Number Range Is 0 - 65535)	
			Alternate Server IP Address (Enter IP Address)	
			Alternate Server Port (Enter Port Number Range Is 0 - 65535)	
			Listen Port (Enter Port Number Range Is 0 - 65535)	
		Monitoring Method: Ethernet Modbus	Autoupdate: Disabled	
			Listen Port: 00502	
			Station Address: Default is 2 (Enter Value Ranging From 0 – 255)	
		Monitoring Method: Ethernet Eagle 2.0	Autoupdate: XX Hours - XX Minutes	Hours (Enter Value Ranging From 0 - 24)
				Minutes (Enter Value Ranging From 0 - 59)
			Primary Server IP Address (Enter IP Address)	
			Primary Server Port (Enter Port Number Range Is 0 - 65535)	
			Alternate Server IP Address (Enter IP Address)	
			Alternate Server Port (Enter Port Number Range Is 0 - 65535)	
			Listen Port (Enter Port Number Range Is 0 - 65535)	
	Alternate Data Monitoring	Same Menu as Primary Data Monitoring.[3]		

1. Menu option applies to AT&T modems only. Menu is not shown when Verizon modem is installed.
2. Ethernet SNMP, if used, must be selected as the Primary Data Monitoring method.
3. Monitoring Options are mutually exclusive. Example: If RS 485 Modbus RTU is selected in either menu, it is removed from the available options in the other menu.

Monitoring Status

The Monitoring Status menu is only available on the unit programmed as System 1. This menu provides information such as signal strength, cell number, cell ESN and time since last poll.

The Test Connect option allows the user to manually test the unit's ability to connect to the monitoring system. All headings in the Monitoring Status menu, other than Test Connect, are informational only.

Monitoring Status (System 1 Only)	Signal Bars (Cellular Eagle 2.0 must be selected as Primary or Alternate Data Monitoring Method)	
	Signal DB (Cellular Eagle 2.0 must be selected as Primary or Alternate Data Monitoring Method)	
	CIP (Cellular Eagle 2.0 must be selected as Primary or Alternate Data Monitoring Method)	
	Cell Number (Cellular Eagle 2.0 must be selected as Primary or Alternate Data Monitoring Method)	
	Cell ESN (Cellular Eagle 2.0 must be selected as Primary or Alternate Data Monitoring Method)	
	Since Last Poll	
	Test Connect	Yes /No
		Yes Confirm?
	Ethernet Link: (Status)	

Local Diagnostics

The Local Diagnostics menu allows the user to review the status of each SC 370, beacon and marker tier, if installed. The Local Diagnostics menu provides valuable information when troubleshooting the system.

Site Event History

Site Event History provides a list of the 30 most current events or alarms affecting the operation of the SC 370. A few examples of events that may be found in the event history are:

- MODE OVR (Mode Override)
- BCN1 COMM (Beacon1 Communication failure)
- MKRT1 COMM (Marker Tier 1 Communication failure)
- REBOOT EVENT (System Reboot)

All events, except "REBOOT EVENT", are followed by an arrow and either "ALM" (Alarm) or "RST" (Restore) to show their state at the time of the event. Move the * to an event and press ENTER to display the time in days hours and minutes since the event occurred.

> **Note:** The SC 370 maintains event times cumulative up to 30 are displayed. Event age beyond the latest "REBOOT EVENT" is for indicative purposes only. It does not reflect how long the unit was off.

Local Diagnostics	Site Event History [1]	Mode Override ➡ Off	Mode Override ➡ Off
			0D 0h 15M
		Mode Override ➡ On	Mode Override ➡ On
			0d 0H 20M
	Controller	Days Operating	
		Firmware Revision	SB Control: Month Day Year Hours Min Sec
			Firmware [Version X.X]
		Controller A2D (Values)	Temperature
			Tower Voltage
			Photo Diode Value
		Site Name	
		Site ID	
		GPS (Status Only) [2]	GPS Communications
			Antenna
			Satellites In View
			Last Sync.
	Beacon	Days Operating	
		Firmware Revision	SB Beacon: Month Day Year Hours Min Sec
			Firmware [Version X.X]
		White A2D	
		Red A2D	
		Misc A2D	
		IR A2D [3]	
	Marker	Days Operating	
		Firmware Revision	SB Marker: Month Day Year Hours Min Sec
			Firmware [Version X.X]
		Marker A2D	
		Misc A2D	

1. Examples of events that may be found in the Site Event History menu. Event time is maintained since the last "REBOOT EVENT". This example shows that the system was in Mode Override for five minutes.
2. GPS diagnostics menu is available only if GPS SYNC is enabled in the Site Tower Configuration menu.
3. IR Enable selection must be set to "Yes" in the "Site Tower Configuration menu" for IR A2D value to be displayed.

Lighting Inspection (LI)

The Lighting Inspection (LI) menu allows the user to test the alarm function of the beacon in all modes, markers and the photodiode dry contact. The Lighting Inspection can be performed as an automatic function (Auto Fast LI) or manually. The manual Lighting Inspection has three modes available: Manual Fast LI, Manual Staged LI and Manual LI. Manual LI modes require the unit to already be in the correct mode or manually placed in the correct mode before the test can be conducted. The system will ignore a test request until the unit is placed in the correct corresponding mode. A description of each LI mode is provided in the following bullet points:

- Automatic Fast LI cycles through all test points and logs the results for each. No interaction is required during an Automatic LI. The previous test results can be reviewed by selecting Display Previous Results in the Auto Fast LI menu.
- Manual Fast LI mode tests the beacons and markers simultaneously. The restore stage for each test is held for user input.
- Manual Staged LI mode tests each beacon and marker singly and sequentially. The restore stage for each test is held for user input.
- Manual LI requires each test point to be selected. Once the selected function has been tested, the function must be restored and the next test point selected. This method continues for all lighting components installed in the system.

Note: Some monitoring systems require additional time between alarm generation and receipt of the alarm. Manual LI mode is recommended in this instance.

Lighting Inspection (LI)	Display Previous Results	"No Valid Results" Will Be Displayed If A Lighting Inspection Has Not Been Performed.	
	Auto Fast LI	Begin Test (1 Button Inspection - Beacons & Markers Tested In Parallel With No User Interaction.)	Yes /No
			Yes Confirm?
	Manual Fast LI	Begin Test (Beacons & Markers Tested in Parallel. Holds Restore Stages For User Input.)	Yes /No
			Yes Confirm?
	Manual Staged LI	Begin Test (Beacons & Markers Tested In Each Mode Singly & Sequentially. Holds Restore Stages for User Input.)	Yes /No
			Yes Confirm?
	Manual LI	Beacon Day Alarm	Alarm/Normal
		Beacon White Night Alarm	Alarm/Normal
		Beacon Red Night Alarm	Alarm/Normal
		Beacon Comm. Alarm	Alarm/Normal
		Marker Alarm	Alarm/Normal
		Marker Comm. Alarm	Alarm/Normal
		Photodiode Dry Contact Test	Alarm/Normal

Mode Override

Mode Override allows the system to be manually placed in any capable mode for a user definable period of up to 24 hours. Once the mode override function has been activated, Override Mode will show the operating mode of the system. Override Left displays the amount of time remaining in the current Override Mode. Cancel Override returns the system to normal operation with mode control directed by the photodiode.

Mode Override	Start Mode Override	Override Mode	White Day[1]
			White Night
			Red Night[2]
		Override Time	Hours (Enter Value Ranging From 0 - 24)
			Minutes (Enter Value Ranging From 0 - 59)
		Start Override	Yes /No
	Cancel Override		Yes /No
	Override Mode: (Displays The Current Override Mode)		
	Override Left: (Displays The Amount Of Time Remaining In The Current Override Mode)		

1. System will not flash when Override Mode "White Day" is selected for systems programmed as "Tower Type Red"
2. Option will not be displayed for systems programmed as "Tower Type White".

System Settings

This menu allows an individual SC 370 to restart without physically interrupting the power, or allows the configuration settings to be restored to factory default values.

Note: Firmware Version 3.4 or higher required.

System Settings	System Reboot	Yes /No
		Yes Confirm?
	Reset Factory Default	Yes /No
		Yes Confirm?
	Customized Configuration[1]	Waiting for password
		*****

1. Requires a valid password to set the customized configuration. Upon success unit will set the customized configuration based on the password entered.

System X Firmware

This feature allows System 1 to display, and if appropriate, upgrade the firmware version of each connected subordinate unit to its current version.

Note: Subordinate units must be firmware Version 3.0 or higher to receive the firmware upgrade from System 1.

System X Firmware[1]	Help	This Menu Allows You To Upgrade The Firmware Of Subordinate Vanguard System Controllers. You May Upgrade A Particular Controller Or All Controllers. When Started, This Controller Will Transfer Its Firmware Package To The Target Controllers. Once Complete, The Target Controllers Will Reboot With The New Firmware.
	System 1 [V 3.1]	
	Upgrade All[2]	Yes/No
		Yes Confirm?
	System 2 - 6 [V X.X][2]	Yes/No
		Yes Confirm?

1. Firmware Version 3.1 or higher required.
2. Progress will be displayed as a percentage on the master and subordinate unit(s) during the upgrade. The upgraded subordinate unit(s) will reboot immediately after firmware upgrade is complete.

USB Firmware Update

This feature allows any unit with an installed PCB3 Smart Board to be updated via a USB drive. Insert the drive into the USB port located on the lower edge of PCB3 (see Figure 1-5). Once the update package is located on the drive, the unit's current firmware version will be displayed in a menu similar to "System X Firmware" and ask if you want to update the firmware. Select yes to update; once completed, the unit will reboot and the USB drive may be removed.

Note: Subordinate units must have firmware version 3.0 or higher to receive the firmware update from System 1.

Information Display Alarms

The information display provides more comprehensive alarm information than the alarm LED's located on PCB 1. See Table 3-3 for a complete list of possible alarms and their definitions.

Table 3-3 – Information Display Status and Alarm Definitions

Alarm	Definition
STATUS: POWER UP MODE	Indicates that the system is in its initial boot stage.
STATUS: DAY ALARM	The connected flash head is exhibiting a white day alarm.
STATUS: WNIGHT ALARM	The connected flash head is exhibiting a white night alarm.
STATUS: RNIGHT ALARM	The connected flash head is exhibiting a red night alarm.
STATUS: BCN COMM	The SC 370X is experiencing a communications failure with the connected flash head.
STATUS: MKR ALARM	The connected marker interface PCB is reporting failure of one or more markers.
STATUS: MKR COMM	The SC 370X is experiencing a communications failure with the connected marker interface PCB.
STATUS: SYS COMM	General communications failure indication. Any communication failure in the system will generate a SYS COMM failure on System 1. The SYS COMM alarm will be accompanied by a specific communication alarm if the failure is local to System 1. Absence of a specific communication failure on System 1 indicates a communication failure on a subordinate unit (System 2-6). A communication failure on any subordinate unit will be accompanied by a SYS COMM alarm.
STATUS: CFG ALARM	The system is configured incorrectly. Examples of incorrect configurations are: • The SC 370 has found a marker interface PCB connected to a system programmed as white only. • A marker interface PCB is connected to a system configured as Catenary. • Four SC 370's are discovered on a system configured for three SC 370's.

Note: Information Display Status and Alarm Definitions continue on the next page.

Table 3-3 – Information Display Status and Alarm Definitions (continued)

Alarm	Definition
STATUS: BIND ALARM	System 1 only. The "BIND ALARM" can be generated by either of the following conditions: • One or more controllers are not bound correctly. A "SYS COMM" alarm will accompany the "BIND ALARM". • Two or more controllers are bound to the same connected equipment (beacon or marker tier). A "SYS COMM" alarm will **not** accompany the "BIND ALARM" in this instance. The most noticeable symptom is a beacon that is not flashing in "Sync." with the rest of the system. This alarm can be corrected by unbinding then binding the tower. "LOCAL TOWER CONFIG" (this section) provides complete instructions for the binding/unbinding procedure.
STATUS: TWR SYNC	System 1 only. One or more subordinate units have not synchronized with System 1 for a period of one hour or more.
STATUS: GPS ALARM	System 1 only. GPS synchronization has not occurred for a period of one hour or more. Possible causes are: • GPS antenna is obstructed or does not have a clear view of the sky. • GPS antenna failure. Check GPS status LEDs located on PCB 3 for "short" or "open" indication. • GPS receiver fault • PCB 3 failure.
STATUS: IR ALARM	The connected flashhead is exhibiting an Infrared alarm.
STATUS: IR N/A	Infrared is not available or supported by the connected flashhead.
STATUS: PD ALARM	System 1 only. More than 19 hours have passed since the system has changed modes via the photodiode input.
STATUS: POWER FAIL	System 1 only. Primary input power failure. PCB 1 is operating on battery backup to provide alarm notification.
STATUS: LOW DC	Output voltage (60 VDC) to the connected flashhead and marker tier (if present) is low.
STATUS: LI TEST MODE	Systems 2-6 only. Indicates that System 1 is conducting a Lighting Inspection test on the system.
STATUS: SYS(x) OVR	System 1 only. Indicates that subordinate system (x) is currently in mode override.
SD CARD IS INSERTED. PLEASE REMOVE IT FOR NORMAL SYSTEM OPERATION	An SD Card was left inserted in the controller after an upgrade. It will need to be removed to resume normal controller function.
STATUS: BCN DISABLED	Indicates that beacon is disabled on this system, not flashing and no communication alarm will be triggered
STATUS: MKR DISABLED	Indicates that markers are disabled on the tower, turned off and no configuration alarm will be triggered

Section 4– Web Interface

Web Interface (Optional)

The Web Interface provides a convenient way to configure the system, perform Lighting Inspections and temporarily control mode remotely. Additionally, useful information such as alarm and event history, cumulative runtime and component temperature may be viewed.

With the optional Wi-Fi antenna installed, virtually any smartphone, tablet or laptop computer with Wi-Fi capabilities may be used to access the system locally without the need to install additional software.

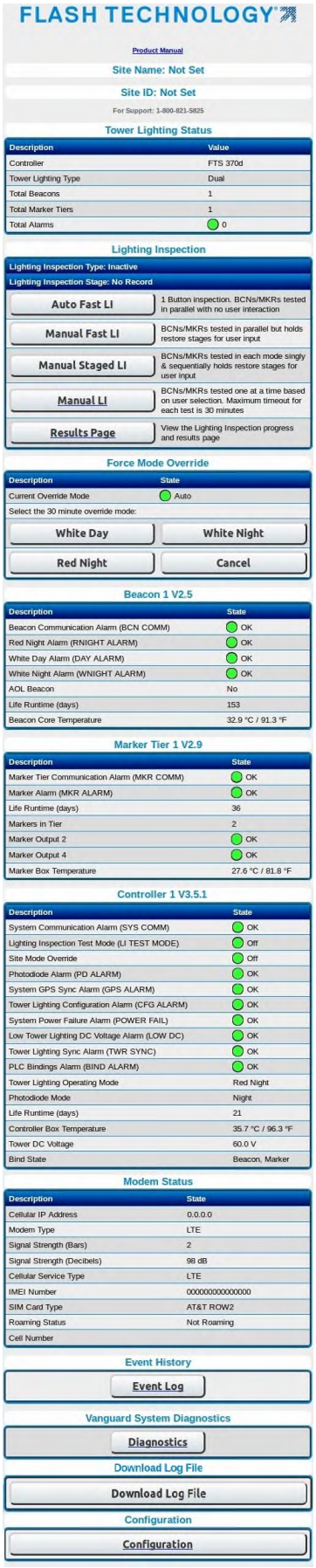
Follow the steps below to connect the portable device to the host SC 370 unit using either the permanently installed Wi-Fi or temporary use USB Wi-Fi. When connected, the web browser will display a screen similar to the one shown to the right.

Web Interface Access (Wi-Fi):

1. Access the Wi-Fi settings menu on the device and verify that Wi-Fi is enabled.
2. Locate the Network Selection menu and choose “Other” or “Add Network”
3. Type “Vanguard” in the Network Name or SSID field.
4. Select “WPA2” in the security field.
5. Enter “Flashadmin” in the password field and press “connect”.
6. Verify that the device is connected to the “Vanguard” network and close the Wi-Fi settings menu.
7. Open an internet browser on the device and enter the following web address: 192.168.1.11

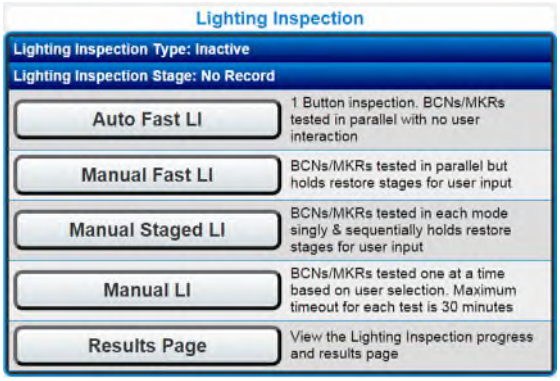
Web Interface Access (USB Wi-Fi):

1. Access the Wi-Fi settings menu on the Wi-Fi enabled device and verify that Wi-Fi is enabled.
2. Select the “Vanguard USB” network.
3. Enter “FlashAdmin” in the password field and connect to the network.
4. Once connected open an internet browser on the device and enter the following web address: 192.168.2.11



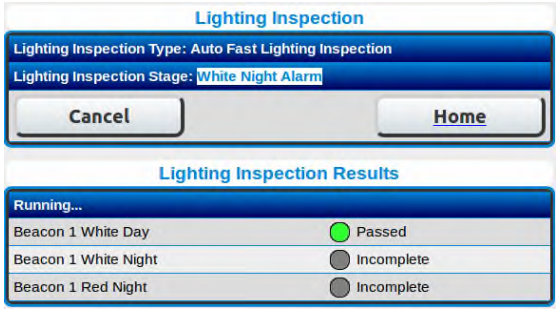
Lighting Inspection (LI)

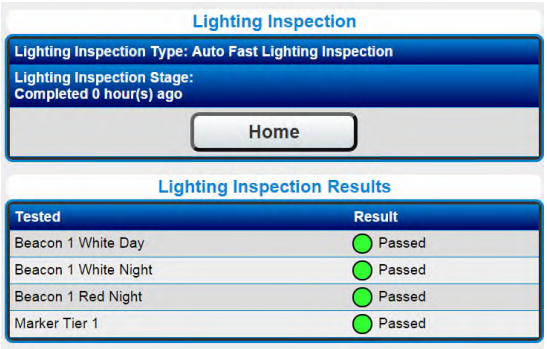
The following four options are available via the Web interface to perform a Lighting Inspection: Auto Fast LI, Manual Fast LI, Manual Staged LI and Manual LI. A brief description of each LI type is provided on-screen beside the selection. The Test Page button displays previous LI results or displays the current LI in progress.



Auto Fast LI

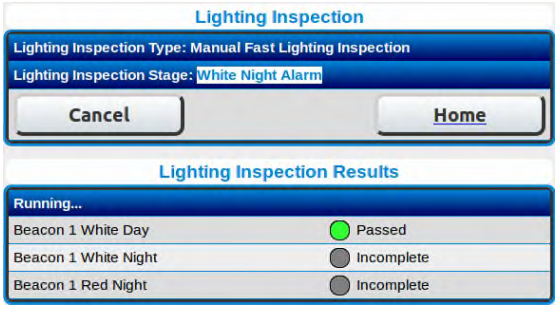
Once initiated, the Auto Fast LI requires no additional input from the user. The results are displayed automatically upon completion of each test.

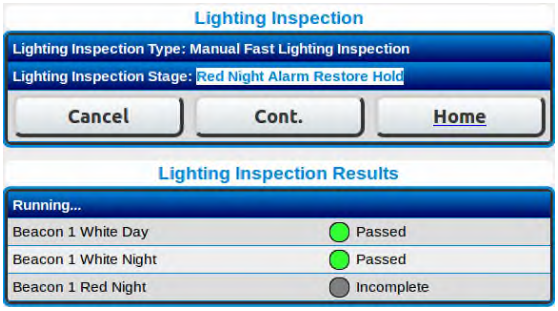




Manual Fast LI

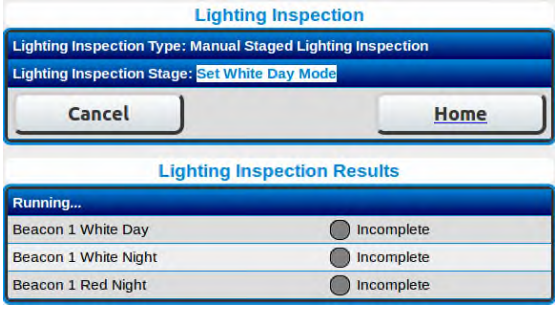
The Manual Fast LI mode tests the beacons and markers simultaneously. The restore stages are held awaiting user input before advancing to the next test. In this mode, the user must press “Cont.” (Continue) before the system will restore the alarms and advance to the next test. The results are displayed once each tests is completed.

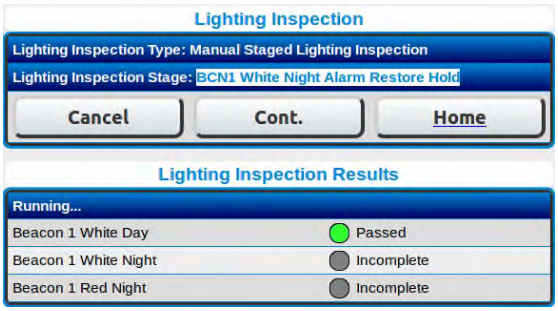




Manual Staged LI

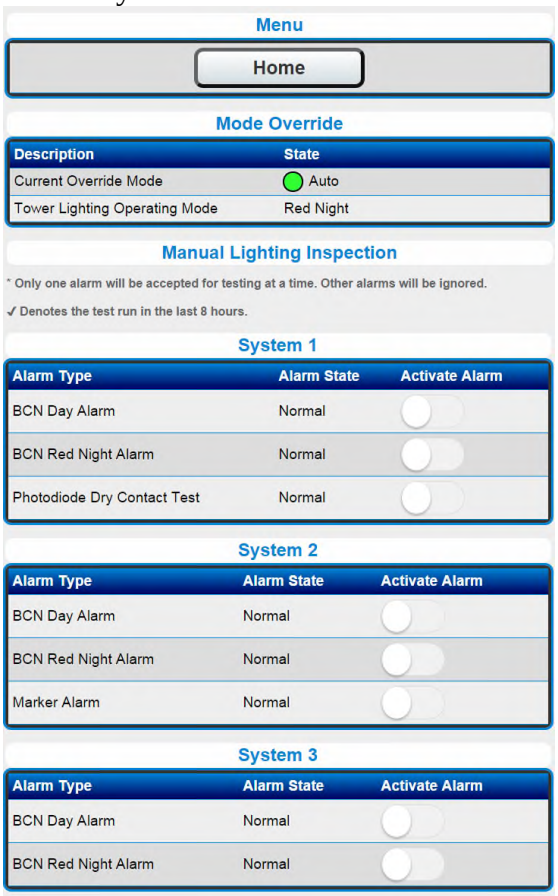
The Manual Staged LI tests each lighting component individually in sequence. The restore stage for each component is held awaiting user input before advancing to test the next component. In this mode, the user must press “Cont.” (Continue) before the system will restore the alarm and advance to the next test. The results are displayed once each tests is completed.





Manual LI

The Manual LI allows testing of an individual lighting component. Once an alarm is activated on the Manual LI page, the system will not restore the alarm or allow another lighting component to be tested until either the current alarm is restored or 30 minutes have passed. A checkmark will appear next to any alarms that have been tested in the last 8 hours. If a mode change is required for the requested alarm, a slight delay will occur while a mode override is issued to the desired system.



Mode Override

The Force Mode Override menu, located below "Lighting Inspection" allows manual selection of the system's mode. System control will return to automatic after 30 minutes.

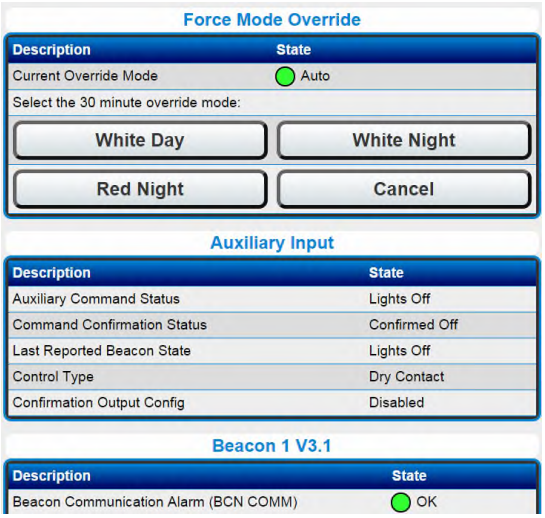
The following screen will be displayed for 10 seconds after a mode override selection is made.

The current override mode will be indicated by a yellow "dot" followed by the selected mode. Mode override can be cancelled at any time by pressing the "Cancel" button in the "Force Mode Override Menu".

Auxiliary Input

If enabled, "Auxiliary Input" section is shown between "Force Mode Override" and "Beacon 1". This menu is informational only and displays the configuration and current status of the interface.

Note: Refer to Section 1 "P2 Aux. Input", Section 3 "Site Tower Config. - Aux Input", and "Tower Lighting" Configuration below for additional information regarding configuration of the Auxiliary Input.

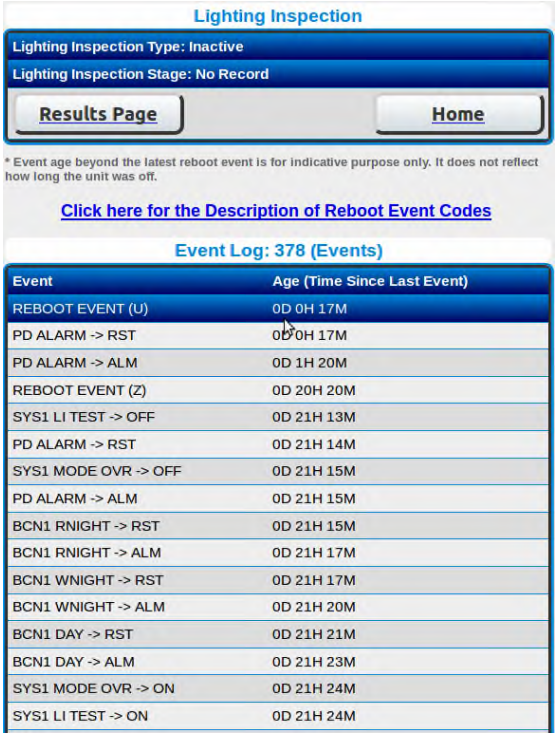


Event Log

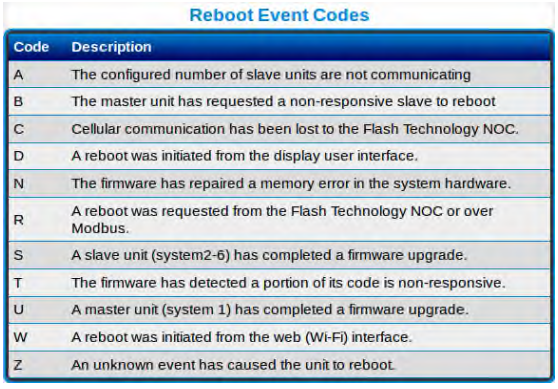
The Event Log displays all events or alarms (up to 500) affecting the operation of the SC 370. A few examples of events that may be found in the event log are:

- MODE OVR (Mode Override)
- BCN1 COMM (Beacon1 Communication failure)
- MKRT1 COMM (Marker Tier 1 Communication failure)
- REBOOT EVENT (System Reboot)

All events, except "REBOOT EVENT", Lighting Inspection and Mode Override, are followed by an arrow and either "ALM" (Alarm) or "RST" (Restore) to show their current state. Mode Override is indicated as either "On" of "Off". The Age of the event is shown in days – hours – minutes format since the event occurred.

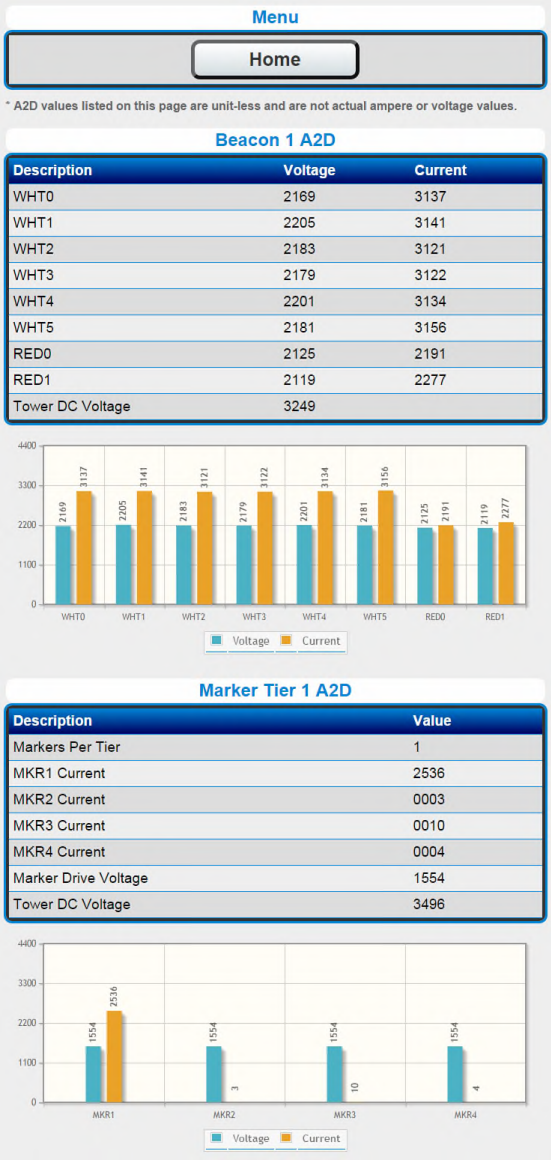


Note: The SC 370 reboot events are coded by reason. The reboot event codes can be viewed by clicking on the link in the **Event Log** page.



Diagnostics

The Diagnostics page includes bar graphs and A2D values for both Beacons and Marker Tiers.

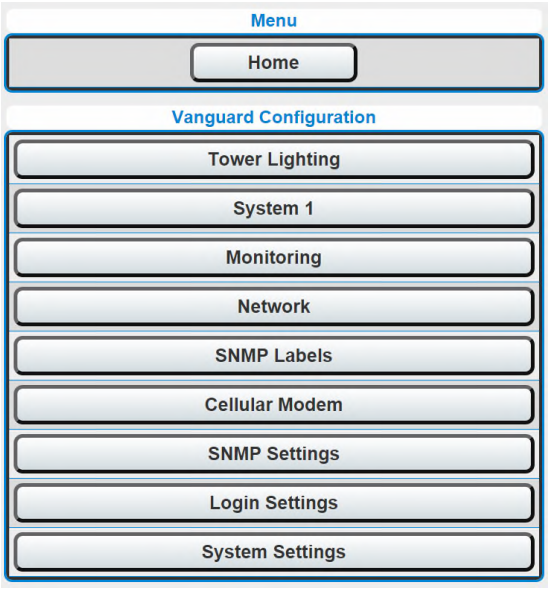


Note: In the event of a communication failure, the last known A2D values will be displayed along with a warning message.

Configuration

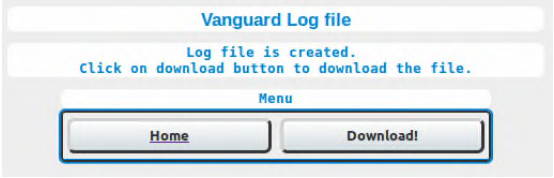
The Configuration menu provides access to program all functions of the lighting system except “Control Type” (System 1 – System 6) which must be programmed through the user interface of each connected SC 370. A pictorial of the top level Configuration menu follows this text.

The headings following the pictorial provide a brief overview of each top level Configuration menu option.



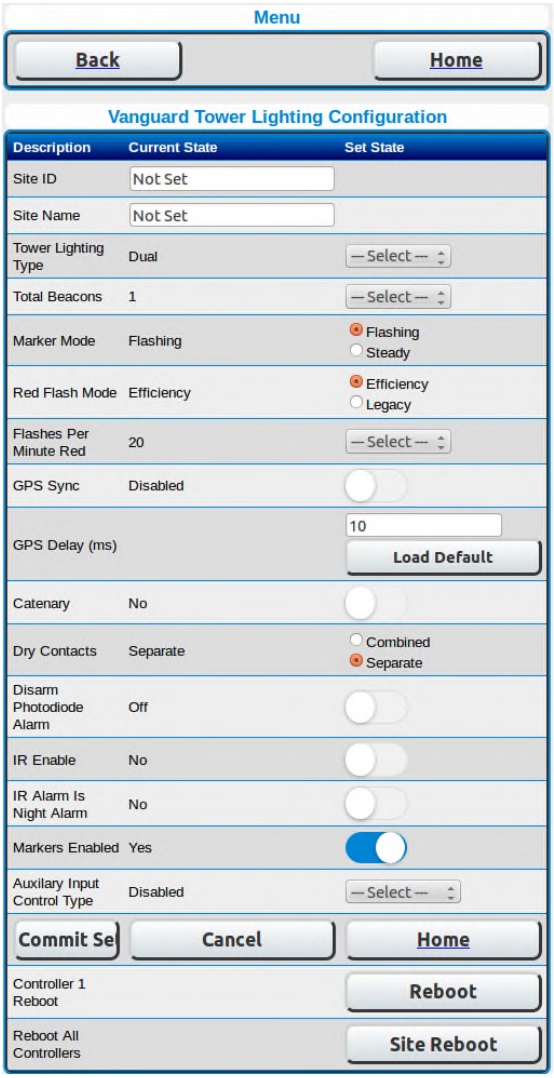
Download Log File

The Download Log File page allows the user to download the log file from the unit and can be sent for analysis. Click on Download button to download the log file.

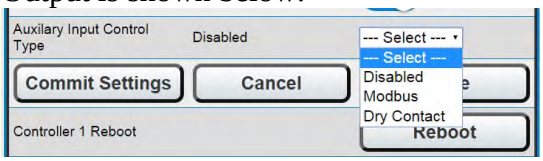


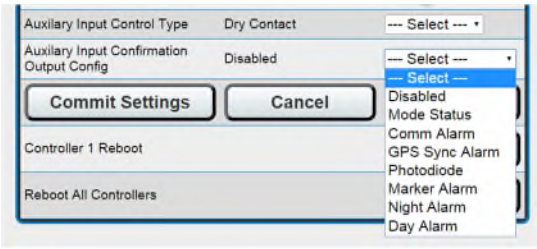
Tower Lighting

The Tower Lighting menu provides all programming options discussed in Section 3 “Site Tower Config”. It also adds the option to input the site name and site ID.



Options for configuration of Auxiliary Input Control Type and Confirmation Output is shown below.





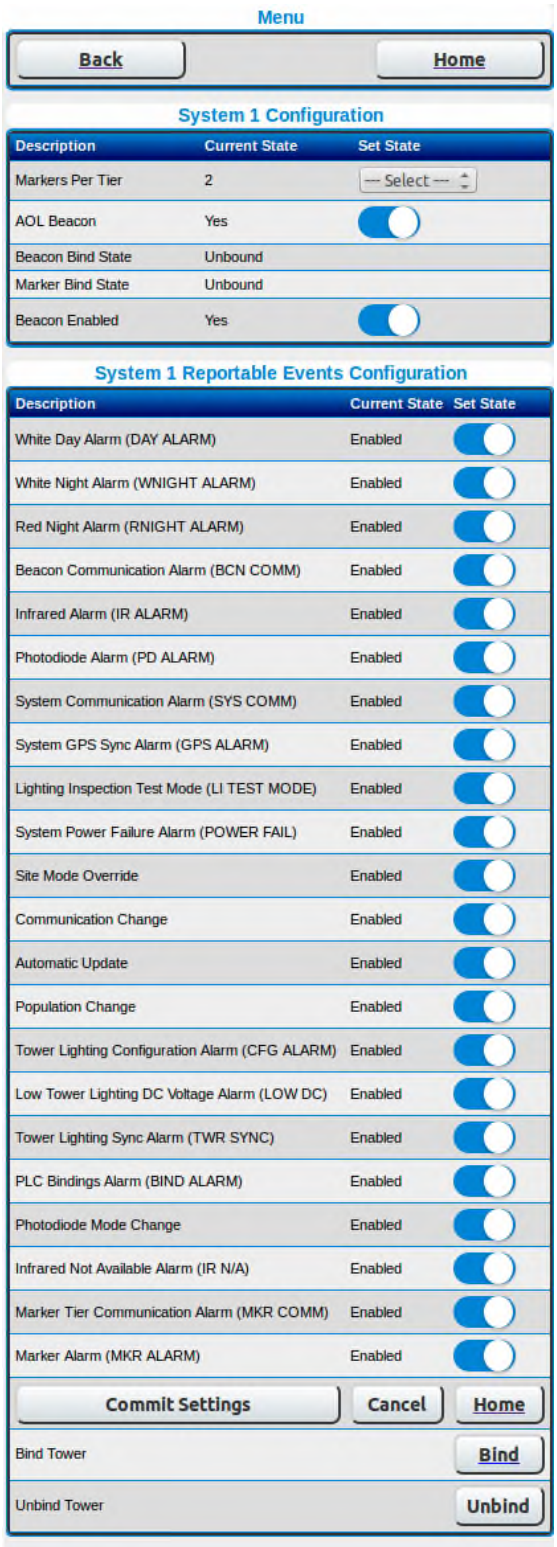
System “X”

The System “X” Configuration menu is similar to the “Local Tower Config Menu” with one exception: the Bind and Unbind features are only available on single beacon systems (one SC 370 controller). Only the bind status will be displayed when more than one SC 370 is installed. Catenary Level programming will be displayed if Catenary is selected in Tower Lighting menu.

> **Note:** The “Bind Tower” and “Unbind Tower” options are available on single beacon systems only (one SC 370). See Section 3 “Local Tower Config” for information regarding “Bind Tower” and “Unbind Tower”.

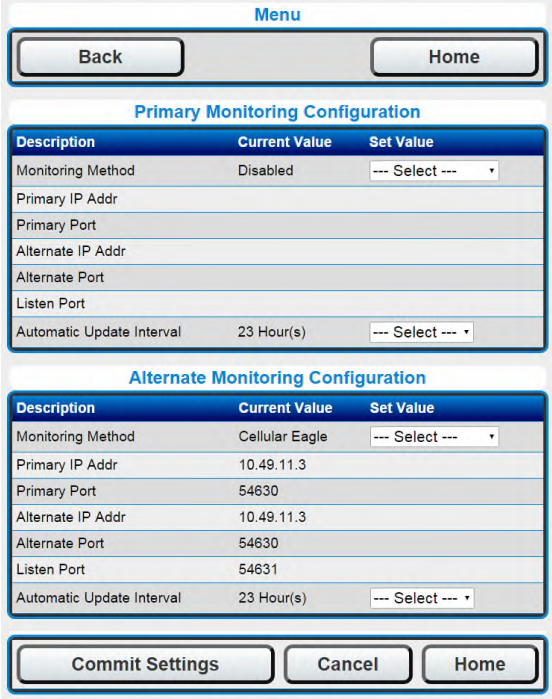
Reportable Events Configuration allows the end user to determine which events are reported to the monitoring center via Eagle or SNMP. By default, all reportable events are configured as “Enabled”. To disable specific events, select the “Disable” button located to the right of the event. Once all desired events are selected, press the “Commit Settings” button near the bottom of the page. State changes for events that have been disabled will appear on the web interface with a gray circle as the indicator. Disabling reportable events does not impact alarm dry contacts, Modbus, Event Log, alarm LED indicators or information displayed locally by the user interface. Disabling of **alarm** events, prior to issuing all required notifications, is discouraged.

> **Important!** Flash Technology discourages disabling **alarm**s prior to issuing all required notifications.



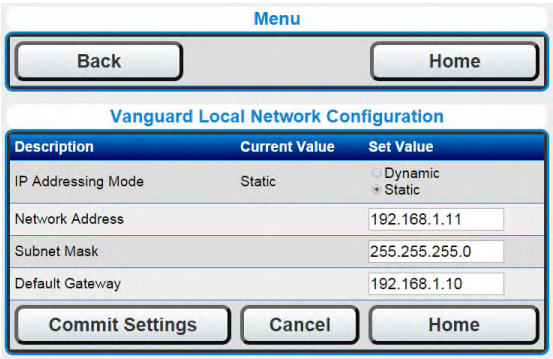
Monitoring

The Monitoring menu allows selection of the Primary and Alternate data monitoring methods discussed in Section 3 “Monitoring Configuration”.



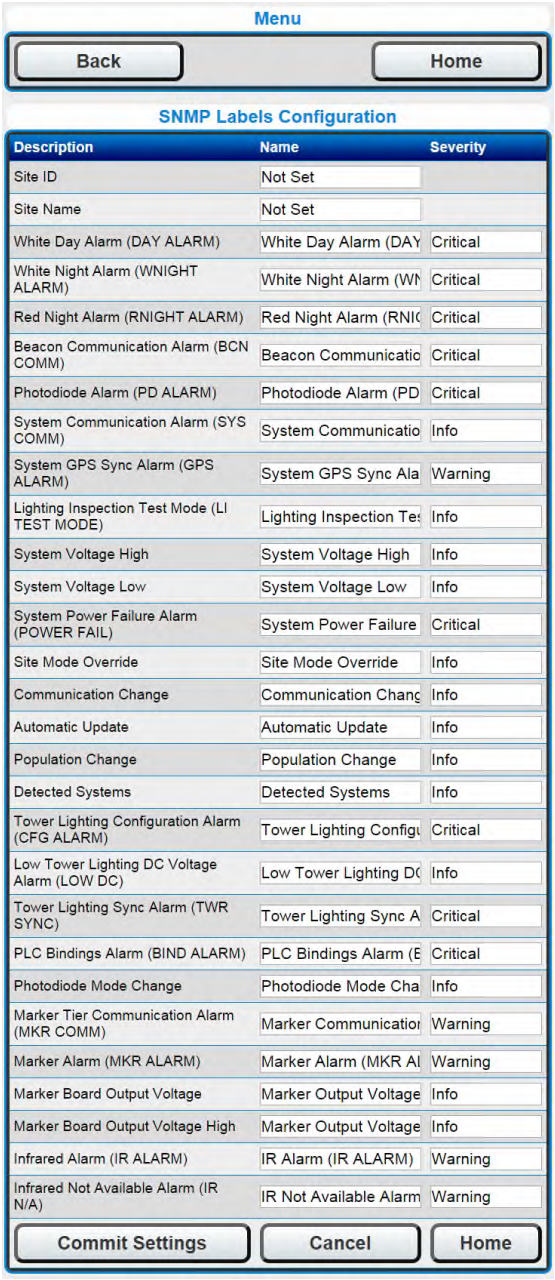
Network

Once the Primary and Alternate monitoring methods are selected, the appropriate configuration options for each method are available in the Network menu. Refer to in Section 3 “Local Network Configuration”.



SNMP Labels

The SNMP Labels menu provides access for the end user to change the name and severity of the SNMP trap based on their needs. The label changes will not be reflected locally in the system menu.



SNMP Settings

This menu allows for configuration of various settings related to SNMP. In the System Settings menu, the option to choose SNMP version V2C or V3 exists. The settings available on this page will vary based on that selection.

Access List Status

When enabled, the system will enforce the configured SNMP access control list. This setting is disabled by default.

Authentication Traps

When enabled, a trap will be sent for every unauthorized access attempt. This setting is disabled by default.

Communities (V2C only)

Up to four access communities may be configured. For each community a name, IP address and access type may be configured. The access type options are "Disabled", "Read-Only" and "Read-Write".

Users (V3 only)

Up to four users may be configured. Each user will have the following settings:

User Name

Maximum 20 characters, no spaces

User Security Level

Security level adopted for access.
• Noauthnopriv (No authentication and encryption. Not recommended.)
• Authnopriv (authentication but no encryption)
• Authpriv (authentication and encryption)

User Access Level

The options are "Disabled", "Read-Only" and "Read-Write".

User Authentication Key

Passcode for authentication. Valid range is 8 – 20 characters and may not contain blank spaces or the following special characters: < > " ' \ / (mandatory if Auth is selected as part of security level)

User Privacy Key

Passcode for encryption. Valid range is 8 – 20 characters. Mandatory if Authpriv security level is selected.

Trap Destination Configuration

This section allows for setting up to four trap destination endpoints. The first two endpoints are the same as those configured from the Monitoring Configuration section. Endpoints three and four may only be viewed and configured from the SNMP Settings page.

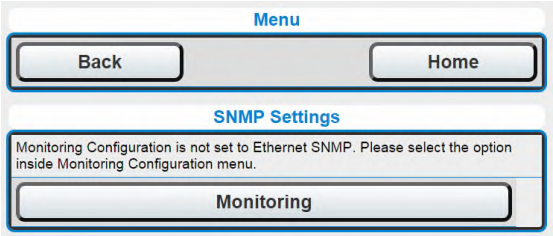
Each endpoint requires an IP address and port. For V3 only, a User Name will associate a SNMP V3 user to this particular trap destination. More than one user can be associated to same destination

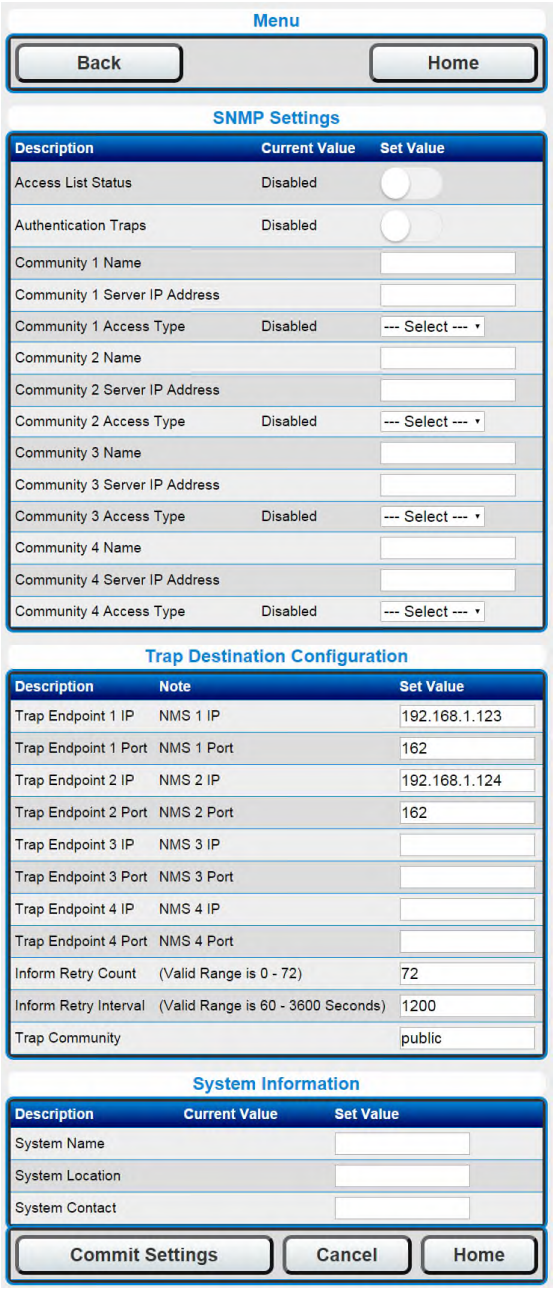
By default a trap requires a confirmation of receipt before the system stops trying to send it. The settings related to this may also be configured in this section. The default is to send a trap up to 72 times every 20 minutes (24 hours total duration) until an acknowledgement has been received. To disable trap retries, simply change the retry count to 0.

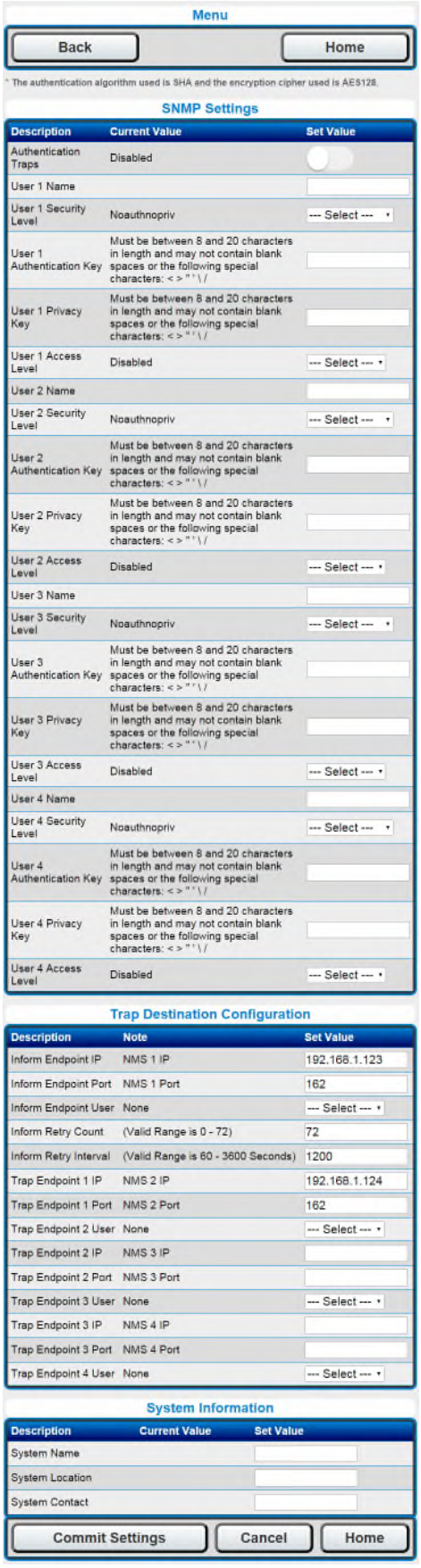
For SNMP V2C only, the trap community string may also be modified. The default value is "public".

System Information

This section allows for configuring the System Name, System Location and System Contact fields.

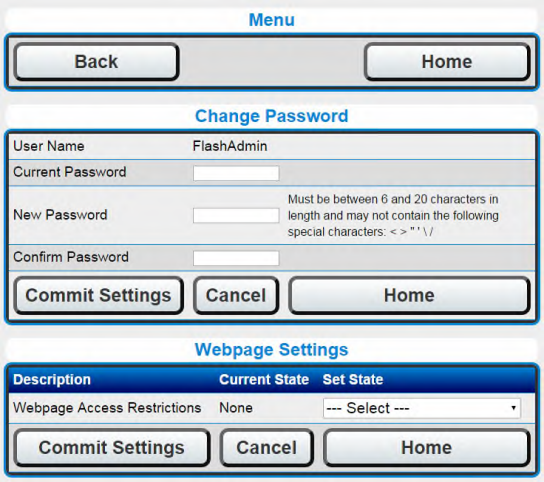

Menu
Back
Home
SNMP Settings
Monitoring Configuration is not set to Ethernet SNMP. Please select the option inside Monitoring Configuration menu.
Monitoring


Menu
Back
Home
SNMP Settings
Description
Current Value
Set Value
Access List Status
Disabled
Authentication Traps
Disabled
Community 1 Name
Community 1 Server IP Address
Community 1 Access Type
Disabled
--- Select ---
Community 2 Name
Community 2 Server IP Address
Community 2 Access Type
Disabled
--- Select ---
Community 3 Name
Community 3 Server IP Address
Community 3 Access Type
Disabled
--- Select ---
Community 4 Name
Community 4 Server IP Address
Community 4 Access Type
Disabled
--- Select ---
Trap Destination Configuration
Description
Note
Set Value
Trap Endpoint 1 IP
NMS 1 IP
192.168.1.123
Trap Endpoint 1 Port
NMS 1 Port
162
Trap Endpoint 2 IP
NMS 2 IP
192.168.1.124
Trap Endpoint 2 Port
NMS 2 Port
162
Trap Endpoint 3 IP
NMS 3 IP
Trap Endpoint 3 Port
NMS 3 Port
Trap Endpoint 4 IP
NMS 4 IP
Trap Endpoint 4 Port
NMS 4 Port
Inform Retry Count
(Valid Range is 0 - 72)
72
Inform Retry Interval
(Valid Range is 60 - 3600 Seconds)
1200
Trap Community
public
System Information
Description
Current Value
Set Value
System Name
System Location
System Contact
Commit Settings
Cancel
Home


Menu
Back
Home
* The authentication algorithm used is SHA and the encryption cipher used is AES128.
SNMP Settings
Description
Current Value
Set Value
Authentication Traps
Disabled
User 1 Name
User 1 Security Level
Noauthnopriv
--- Select ---
User 1 Authentication Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 1 Privacy Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 1 Access Level
Disabled
--- Select ---
User 2 Name
User 2 Security Level
Noauthnopriv
--- Select ---
User 2 Authentication Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 2 Privacy Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 2 Access Level
Disabled
--- Select ---
User 3 Name
User 3 Security Level
Noauthnopriv
--- Select ---
User 3 Authentication Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 3 Privacy Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 3 Access Level
Disabled
--- Select ---
User 4 Name
User 4 Security Level
Noauthnopriv
--- Select ---
User 4 Authentication Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 4 Privacy Key
Must be between 8 and 20 characters in length and may not contain blank spaces or the following special characters: < > " ' \ /
User 4 Access Level
Disabled
--- Select ---
Trap Destination Configuration
Description
Note
Set Value
Inform Endpoint IP
NMS 1 IP
192.168.1.123
Inform Endpoint Port
NMS 1 Port
162
Inform Endpoint User
None
--- Select ---
Inform Retry Count
(Valid Range is 0 - 72)
72
Inform Retry Interval
(Valid Range is 60 - 3600 Seconds)
1200
Trap Endpoint 1 IP
NMS 2 IP
192.168.1.124
Trap Endpoint 1 Port
NMS 2 Port
162
Trap Endpoint 2 User
None
--- Select ---
Trap Endpoint 2 IP
NMS 3 IP
Trap Endpoint 2 Port
NMS 3 Port
Trap Endpoint 3 User
None
--- Select ---
Trap Endpoint 3 IP
NMS 4 IP
Trap Endpoint 3 Port
NMS 4 Port
Trap Endpoint 4 User
None
--- Select ---
System Information
Description
Current Value
Set Value
System Name
System Location
System Contact
Commit Settings
Cancel
Home

Login Settings

The login settings page contains two main functions.



Change Password

The first is the ability to change the password used to login to the configuration pages.

The user name is always “FlashAdmin” and the default password is “FlashAdmin”. The password may be changed to any other password of 6 to 20 characters in length (with the exception of a few special characters).

Webpage Settings

Be default the ability to initiate and cancel a lighting inspection, as well as the ability to initiate or cancel a mode override operation from the main page is allowed without the need to login to the web interface.

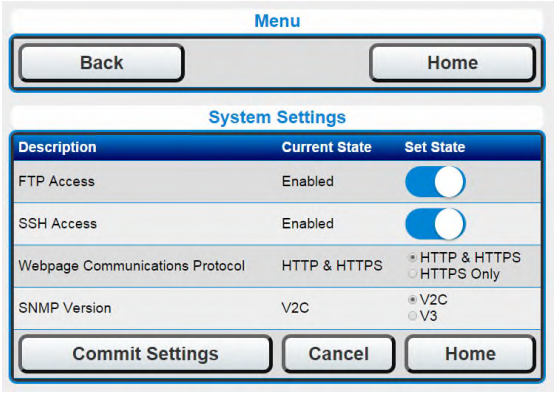
To control access to the web page, change the “Webpage Access Restrictions” to “None”, “Configuration Pages Only”, or “All”.

System Settings

The Vanguard controller is capable of accepting firmware upgrade packages via an FTP transfer, but FTP may be disabled from the “System Settings” page.

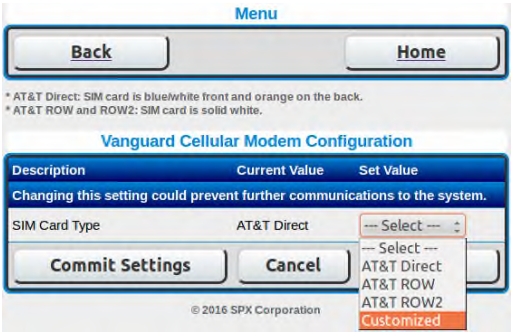
SSH access may also be disabled on this page. As well as restricting access to these web pages to HTTPS only.

This page also allows the SNMP version to be selected.



Cellular Modem

This menu will be displayed only if an AT&T modem is detected in the system. It allows selection of the installed SIM card type as AT&T Direct, AT&T ROW, AT&T ROW2 or Customized. This menu option is not displayed for Verizon 3G modems. See Section 3 “Monitoring Configuration” for additional information.



Note: The front of the AT&T Direct SIM card is blue / white and the back of the card is orange. The AT&T ROW and AT&T ROW2 card is solid white.

Section 5 – Maintenance and Troubleshooting

Safety

Warning!

Read the warning on Page ii now. Disconnect primary power before opening enclosures.

Work safely, as follows:

1. Remove rings and watches before opening the equipment.
2. Shut off power to the equipment. Measure the output voltage at TB2 DC+ and DC-. Verify that the voltage is less than 5V DC before proceeding.
3. Remove the component or connect the test instruments.
4. Replace the component.
5. Apply power to the equipment and test the system.
6. Shut off power to the equipment and disconnect the test equipment.

Preventive Maintenance

Carry out the following inspection and cleaning procedures at least once a year:

1. Verify that moisture has not accidentally entered the equipment through gaskets or seals, or collected inside as condensation.
2. Verify that all drain holes are clear.
3. Check terminal blocks and relays for corrosion or arcing. Clean or replace any component that shows evidence of high-voltage damage.
4. Check all electrical connections for tightness and verify the absence of corrosion or electrical arcing.
5. Clean the outside surface of the lens with liquid detergent and water. Wipe it gently with a soft cloth or paper towel.
6. Due to the extreme temperatures that may be present in the field, it is recommended to replace the backup battery every 1-2 years as part of a periodic maintenance program.

Storage

When not in use, equipment should be stored indoors. Circuit boards (PCB's), when not installed in the equipment, should be kept in antistatic bags or containers.

RFI Problems

The presence of radio frequency interference (RFI) can burn out components; cause a light to flash intermittently, at the wrong rate, or at the wrong intensity. RFI can enter the light by any wire to or from the unit. The circuits are designed to reject or bypass RFI, but Flash Technology cannot guarantee complete immunity. After installation, you may find it necessary to add external filters or use other methods to reduce RFI entering the equipment.

Diagnostic Test

The SC 370 has built in diagnostic capabilities to assist in troubleshooting the system. Flash Technology recommends that a full system diagnostic test is run before troubleshooting individual system components.

Component Testing

Always make resistance measurements with the primary power turned off. However, you must make voltage measurements with power applied. Thus, for your safety, carry out all preliminary steps such as connecting test leads or circuit jumpers or disconnecting existing circuit connections with the power off.

Troubleshooting

Follow the troubleshooting steps in the tables below as applicable. Repair procedures are provided in Component Removal and Replacement.

Table 5-1 – Troubleshooting – Initial Inspection

Step	Check/Test/Action		Action
1.a	Is the flashhead flashing?	Yes No	Go to Step 1.b Go to Step 2.a
1.b	Is the failure related to a connected tier of L810 side markers (marker alarm)?	Yes No	Go to Step 4.a Go to Step 1.c
1.c	Are alarms present on PCB1?	Yes No	Review Tables 1-3 and 3-3. System okay.

Table 5-2 – Troubleshooting – System Voltage

Step	Check/Test/Action		Action
2.a	Is input power applied? Measure at TB1 terminals L1 & L2. Check Circuit Breaker Flag Indicator if green OFF or red ON.	Yes No	Go to Step 2.b Correct problem.
2.b	Is power being output from TB1? Measure at TB1 Circuit Breaker terminals (both poles).	Yes No	Go to Step 2.c Check / Replace Circuit Breaker. Replace VR1.
2.c	Are any of the Status and Alarm Indicators (LEDs or OLED display) lit on PCB1?	Yes No	Go to Step 2.g Go to Step 2.d
2.d	Is the correct voltage present on PCB1? Measure at P2 terminals 1 & 2 (12 VDC).	Yes No	Replace PCB1. Go to Step 2.e
2.e	Are the operational status LEDs lit on PCB4? Note: Verify that the input power switch, located on PCB4 (AC units only), is in the “On” position. See Figure 2-24 for switch location.	Yes NO	Check wiring and connections between PCB4 and PCB1. Go to Step 2.f
2.f	Is the correct input voltage present on PCB4? Measure terminals labeled L1 & L2 for AC power.	Yes No	Replace PCB4 Repair connections between TB1 and PCB4.
2.g	Is the correct voltage present on TB2? Measure at TB2 DC+ & DC- (60 VDC)	Yes No	Go to Step 3.a Go to Step 2.h
2.h	Is the correct voltage present with the flashhead cable disconnected? With input power removed, disconnect the flashhead cable, apply power and measure as described previously at TB2.	Yes No	Inspect flashhead cable, flashhead and marker interface box (if installed) for damage. Check PCB2, PS1 and PS2 for damage. Replace as necessary.

Table 5-3 – Troubleshooting - Flashhead.

Step	Check/Test/Action		Action
3.a	Is the correct voltage present in the flashhead? Measure at flashhead terminal block DC+ & DC- (60 VDC). **Note:** If a marker tier is connected between the SC 370 and the flashhead, verify that the correct input and output voltage is present on TB1 of the marker interface box before proceeding to the flashhead.	Yes No	Go to Step 3.b Inspect flashhead cable and connections.
3.b	Is voltage present on the output of Surge PCB located in the base of the flashhead? Measure at J02 DC+ (2 terminals) & DC- (60 VDC)	Yes No	Go to step 3.c Replace Surge PCB located in the flashhead.
3.c	Are the two LEDs lit on the core board? View through the clear polycarbonate cover on the bottom of the light engine assembly.	Yes No	Replace the light engine assembly. Inspect the wiring harness between the Surge PCB and the Core PCB for loose connection or damage. Repair/replace if necessary. Replace the Core PCB if no problem is found with the wiring harness.

Table 5-4 – Troubleshooting – L810 Side Markers (SC 370 Information Display)

Step	Check/Test/Action		Action
4.a	Are any of the L810 markers on the tier functioning? With the controller in night mode, review diagnostics to determine the type of alarm and the number of failed markers.	Yes No	Go to step 5.b Go to step 4.b
4.b	Is a Marker Comm. alarm present?	Yes No	Go to Step 4.c Go to Step 5.b
4.c	Is the unit programmed correctly? Review the overall system configuration. In a multi-unit installation, verify that the unit in question has a marker tier connected.	Yes No	Go to Step 5.a Correct the system programming and check for proper operation.

Table 5-5 – Troubleshooting – Marker Interface Box

Step	Check/Test/Action		Action
5.a	Is the correct voltage present at TB1 in the Marker Interface box? Measure at TB1 DC+ & DC- (60 VDC).	Yes No	Go to Step 5.b Check flashhead cable between SC 370 and Marker Interface Box.
5.b	Are any marker alarm indicators (1-4) lit on the marker interface PCB located in the marker junction box?	Yes No	Go to Step 5.e Go to Step 5.c
5.c	Is the correct voltage present on J5? Measure at J5 DC+ & DC- (60 VDC).	Yes No	Go to Step 5.d Check/repair wiring between TB1 and the marker interface PCB.
5.d	Are the operational voltage status LEDs lit on the marker interface PCB? See Figure 1-8 for location.	Yes No	Go to Step 5.e Replace the marker interface PCB.
5.e	Is the correct voltage present on the output(s) for the failed marker(s)? Measure DC+ to DC- (24 VDC) on the marker output(s) (J1 – J4) corresponding to the Marker Alarm (1-4).	Yes No	Check wiring for an open connection. Replace LED marker fixture(s) if no wiring fault is found. Go to Step 5.f
5.f	Is the correct voltage present on the output(s) for the failed marker(s) with the marker connections (J1-J4) disconnected from the marker interface board? With the system powered down, unplug the marker connections (J1 – J4) from the marker interface board. Apply power to the system and measure DC+ to DC- (24 VDC) on the marker output(s) (J1 – J4).	Yes No.	Check marker output wiring for a possible short. Replace marker fixture(s) and wiring if necessary. Replace the marker interface PCB.

Table 5-6 – Troubleshooting – GPS Synchronization

Step	Check/Test/Action		Action
6.a	Are there any obstructions that could block the GPS antenna from receiving satellite signal?	Yes No	Remove obstruction(s) or relocate the GPS antenna. Go to step 6.b.
6.b	Is the “Ant. Open” or “Ant. Short” LED lit on PCB 3? Both LED’s are located in the GPS section of PCB3 (see Figure 1-5).	Yes No	Inspect antenna cable. Replace cable and/or antenna if necessary. Go to Step 6.c
6.c	Does “GPS Comm.” show “Fault”? Navigate through the Information Display to “GPS” in the “Local Diagnostics” menu (See Section3).	Yes No	Replace PCB 3 Go to Step 6.d
6.d	Are at least 3 satellites visible to the controller? Navigate through the Information Display to “GPS” in the Local Diagnostics menu (See Section3).	Yes No	Replace PCB3 Reposition antenna.

Note: Table 5-6 is written with the assumption that “Status: GPS Alarm” is present on the unit programmed as System 1.

Component Removal and Replacement

Note the location and color of all wires that you disconnect when troubleshooting or replacing components. Verify that the wiring agrees with the applicable figure in Section 2 after testing or replacing any component.

Important! Review the Safety information at the beginning of Section 5 before removing or replacing any component.

The general procedures for removing components with power disconnected are as follows:

1. Obtain access to the component in question.
2. Completely remove or relocate these components.
3. Disconnect the wiring to the component that you want to replace.
4. Remove the component.
5. Replace everything in the reverse order: first the component, then the wiring. In some cases, you may have to place some wires on the component before you fasten it in place, then replace the remaining wires.

Section 6 – Recommended Spare & Replaceable Parts

Customer Service: 1-800-821-5825

Telephone: (615) 261-2000

Facsimile: (615) 261-2600

Shipping Address:

Flash Technology
332 Nichol Mill Lane
Franklin, TN 37067

Ordering Parts

To order spare or replacement parts, contact Parts Department at 1-800-821-5825.

Table 6-1 “SC 370 (AC)” lists the major replaceable parts for the SC 370.

Table 6-2 “SC 370 (DC)” lists the major replaceable parts for the SC 370 DC.

Table 6-3 “FH 370” lists the major replaceable parts for the FH 370.

Table 6-4 “Marker Interface” lists the major replaceable parts for the Marker Interface box.

Table 6-5 lists the part numbers for additional or optional system parts that are not illustrated in the component diagrams.

RMA Policy

If any system or part(s) purchased from Flash Technology need to be returned for any reason (subject to the warranty policy), please see the current RMA policy available online at: flashtechnology.com/rma.

To initiate an RMA, call the Flash Technology NOC to receive technical assistance (800-821-5825 Option 9, M-F, 7 a.m. to 7 p.m. CT).

Emailing a completed RMA request form to FlashSupport@spx.com can also start the process on sites not requiring detailed troubleshooting. The form can be filled out online at: http://flashtechnology.com/rma-request-form/.

NOTE: An RMA number must be requested from Flash Technology prior to return of any product. No returned product will be processed without an RMA number. Failure to follow the below procedure may result in additional charges and delays. Any product received without an RMA number is subject to return back to the sender. All RMA numbers are valid for 30 days.

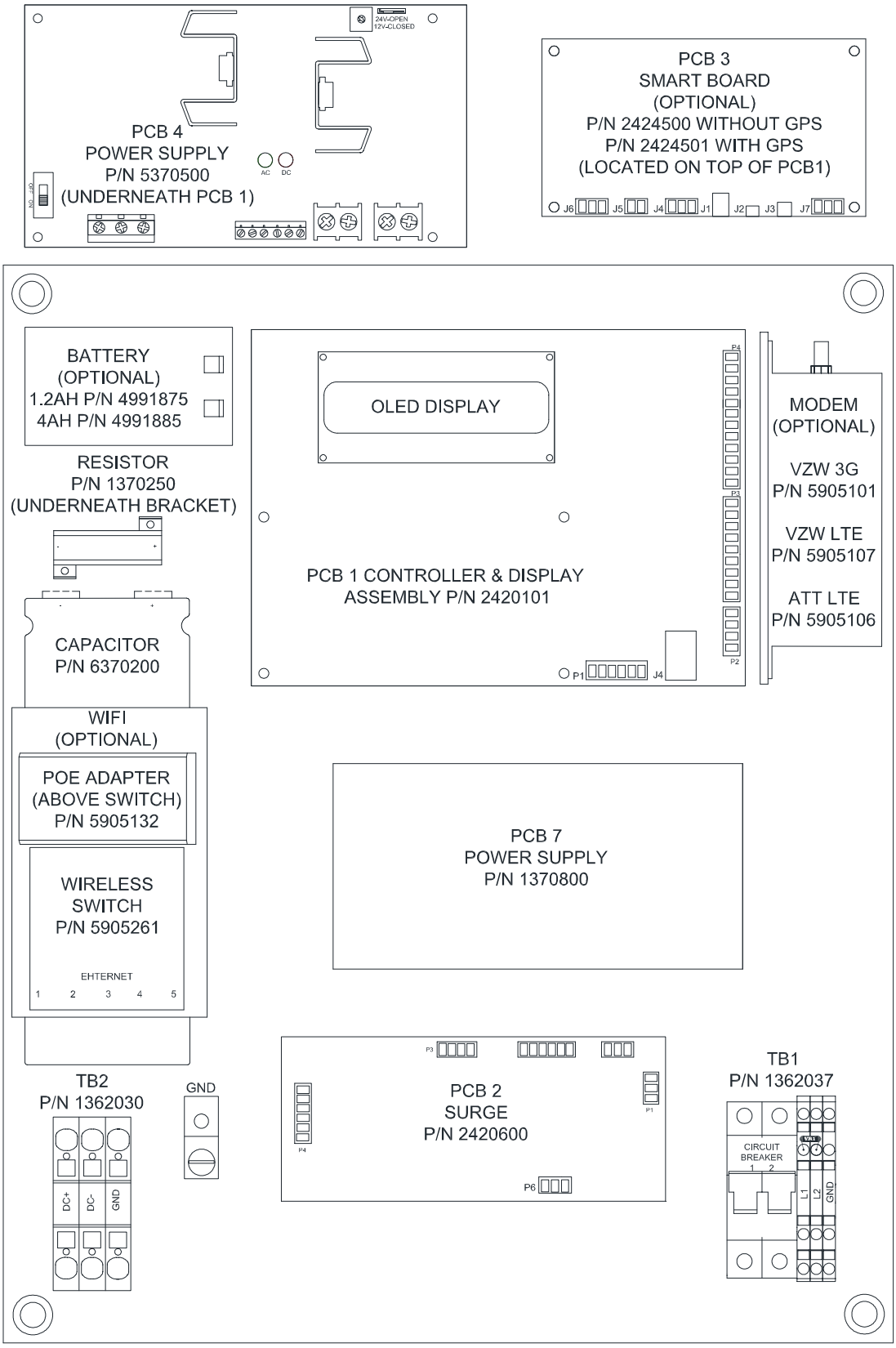


Figure 6-1 – SC 370 (AC) Component Locations

Table 6-1 – SC 370 (AC) Replacement Parts

Reference	Description	Part Number
PCB 1 Assembly	PCB CONTROL SC 370X w/CPU & DISPLAY	2420101
PCB 2	PCB SURGE SC 370X [1]	2420600
PCB 3	PCB SMART BOARD WITHOUT GPS	2424500
	PCB SMART BOARD WITH GPS	2424501
PCB 4	POWER SUPPLY 12VDC 2.5A	5370500
PCB 7	POWER SUPPLY	1370800
CAPACITOR	CAP 230,000MF 75VDC	6370200
RESISTOR	RESISTOR 330 OHM 50W	6370250
BATTERY	BATTERY 12V[2], 1.2Ah	4991875
	BATTERY 12V[2], 4Ah	4991885
MODEM	MODEM WIRELESS VERIZON 3G	5905101
	MODEM WIRELESS VERIZON LTE	5905107
	MODEM WIRELESS AT&T LTE	5905106
Wi-Fi ANTENNA	2.4 GHZ HIGH POWER ANTENNA[3]	5905131
POE	POWER OVER ETHERNET (POE) INJECTOR	5905132
WIRELESS SWITCH	SWITCH 5 PORT GIGABIT	5905261
TB1	TERMINAL BLOCK INPUT POWER SC 370D/W/R	1362037
TB2	TERMINAL BLOCK ASSY SC 370D/W/R & FH 370D/W	1362030
VR1	VARISTOR 230/240V METAL OXIDE[1]	6901081

1. Recommended as a Spare Part.
2. Due to the extreme temperatures that may be present in the field, it is recommended to replace the backup battery every 1-2 years as part of a periodic maintenance program.
3. Antenna is mounted externally.

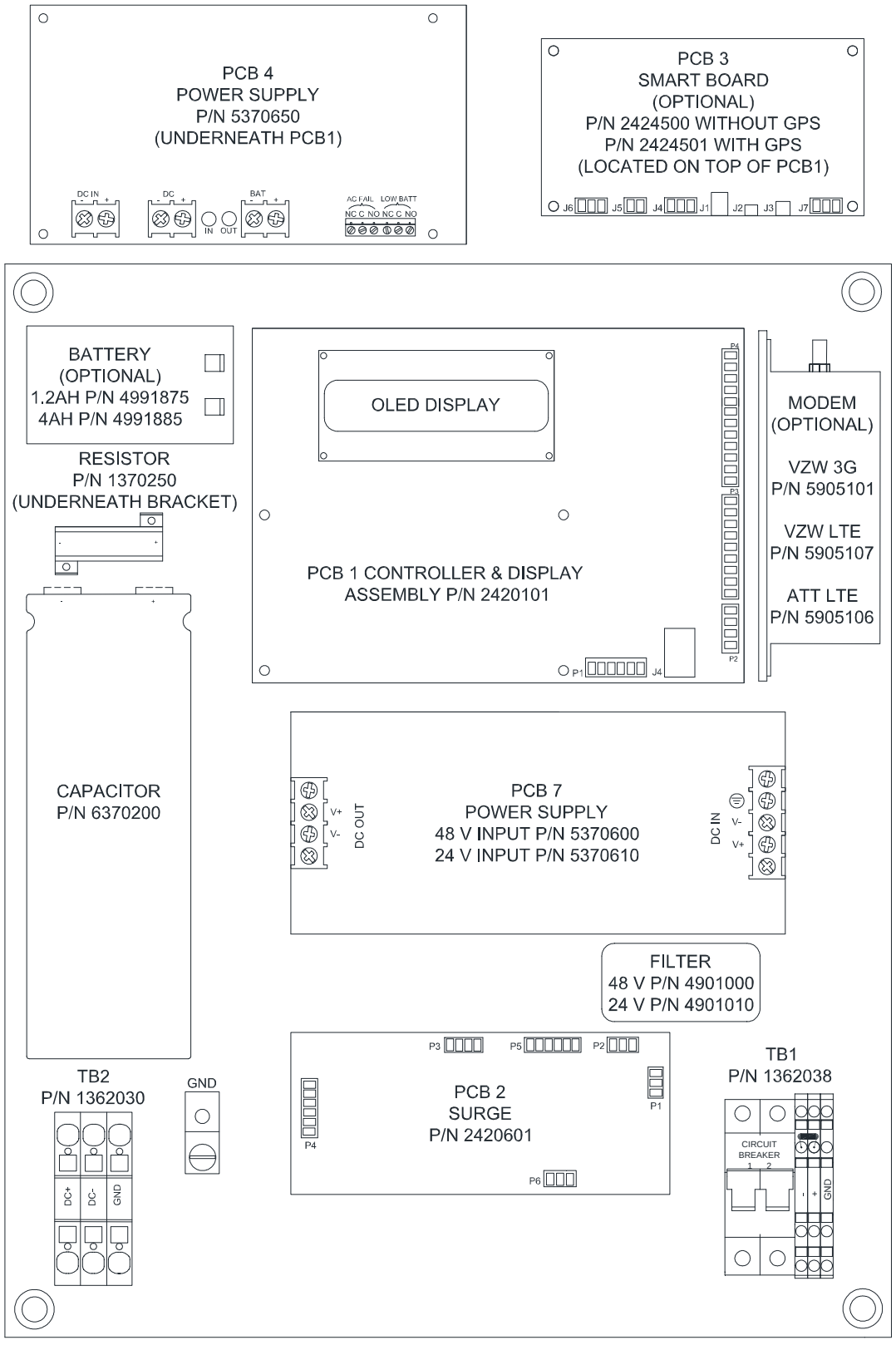


Figure 6-2 – SC 370 (DC) Component Locations

Table 6-2 – SC 370 (DC) Replacement Parts

Reference	Description	Part Number
PCB 1 Assembly	PCB CONTROL SC 370X w/CPU & DISPLAY	2420101
PCB 2	PCB SURGE SC 370X DC[1]	2420601
PCB 3	PCB SMART BOARD WITHOUT GPS	2424500
	PCB SMART BOARD WITH GPS	2424501
PCB 4	POWER SUPPLY DC/DC 12V	5370650
PCB 7	POWER SUPPLY DC/DC 48/60V	5370600
	POWER SUPPLY DC/DC 24/60V	5370610
FILTER	FILTER EMI 10A (48 VOLT SYSTEM)	4901000
	FILTER EMI 20A (24 VOLT SYSTEM)	4901010
CAPACITOR	CAP 230,000MF 75VDC	6370200
RESISTOR	RESISTOR 330 OHM 50W	6370250
BATTERY	BATTERY 12V[2], 1.2Ah	4991875
	BATTERY 12V[2], 4Ah	4991885
MODEM	MODEM WIRELESS VERIZON 3G	5905101
	MODEM WIRELESS VERIZON LTE	5905107
	MODEM WIRELESS AT&T LTE	5905106
TB1	TERMINAL BLOCK INPUT POWER SC 370 DC	1362038
TB2	TERMINAL BLOCK ASSY SC 370D/W/R & FH 370D/W	1362030
VR1	VARISTOR 73.8V METAL OXIDE[1]	11000016139

1. Recommended as a Spare Part.
2. Due to the extreme temperatures that may be present in the field, it is recommended to replace the backup battery every 1-2 years as part of a periodic maintenance program.
3. Antenna is mounted externally.

Table 6-3 – FH 370 Replacement Parts

Reference	Description	Part Number
FH 370d	L-864/L-865, L-866/L-885 LED FLASHHEAD	1370150
FH 370w	L-865 & L-866 LED FLASHHEAD	1370140
FH 370r	L-885 LED FLASHHEAD	1370130
FH 370d IR	L-864/L-865, L-866/L-885 LED FLASHHEAD with IR	1370151
FH 370d	FH 370d LIGHT ENGINE REPLACEMENT	1370155
FH 370w	FH 370w LIGHT ENGINE REPLACEMENT	1370145
FH 370r	FH 370r LIGHT ENGINE REPLACEMENT	1370135
FH 370d IR	FH 370d IR LIGHT ENGINE REPLACEMENT	1370158
FH 370d/w/r	PCB SURGE FH 370d/w/r[1]	2421000
FH 370d/w/r	PCB CORE BOARD FH 370d/w/r	2422500
FH 370d IR	PCB CORE BOARD FH 370d IR	2422600

1. Recommended as a Spare Part.

Table 6-4 – Marker Interface

Reference	Description	Part Number
PCB1	MARKER INTERFACE PCB	2422000
TB1	TERM BLOCK ASSY MARKER JUNCTION BOX	1362034

Table 6-5 – System Replacement Parts

Reference	Description	Part Number
FTS 370D/W/R	INSTALLATION KIT, FTS 370 - SINGLE BCN	1370990
SC 370D/W/R	CABLE KIT SC 370X RS-485 COMM UNSHLD, 6 FT	4362039
SC 370D/W/R	CABLE SC 370X RS-485 COMM UNSHLD, 6 FT[1]	4362025
SC 370D/W/R	CABLE SC 370X RS-485 COMM UNSHLD, 10 FT[2]	4362026
SC 370D/W/R	CABLE SC 370X RS-485 COMM UNSHLD, 15 FT[2]	4362027
FTS 370D/W/R	CABLE TC-ER RATED 10 AWG 2 CONDUCTOR[3]	4210000
FTS 370D/W/R	CABLE TC-ER RATED 8 AWG 2 CONDUCTOR[3]	4370000
FTS 370D/W/R	CABLE TC-ER RATED 6 AWG 2 CONDUCTOR[3]	4206000
SC 370 D/W/R	PHD 516 PHOTODIODE W/20' PIGTAIL	1855516
SC 370 D/W/R	ANTENNA WIDE BAND BULKHEAD MOUNT	4905230
SC 370 D/W/R	SC 370 GPS SYNC KIT	1370185
SC 370D/W/R	ANTENNA GPS WITH GASKET[4]	6903291
SC 370D/W/R	ANTENNA CABLE VANGUARD GPS 50FT[4]	6903293
SC 370D/W/R	KIT, ANTENNA MOUNTING BRACKET[4]	1905355
SC 370 D/W/R	KIT, PANEL MOUNTING ADAPTER (OPTIONAL)	1905036

1. Part is included with CABLE KIT SC 370X RS-485 COMM UNSHLD, 6 FT (PN 4362039).
2. Part is available as an alternative to PN 4362025.
3. Maximum cable length between SC 370 and FH 370 is 375 ft. using PN 4210000.
   PN 4370000 is **required** for cable lengths between 376 ft. and 600 ft. (maximum).
   PN 4206000 is **required** for cable lengths between 601 ft. and 850 ft. (maximum).
4. Part is included with SC 370 GPS SYNC KIT (PN 1370185).