FLASH

Vanguard® Medium FTS 370d, FTS 370w, FTS 370r

LED Medium Intensity Obstruction Lighting System

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 (minimum) 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 inches (avoid bending ground wires if possible).
>
> **Important: Flash Technology recommends that all exposed ground connections be 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 a minimum of 8 inches of unused space on both sides).

☐ There is 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 the 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.

☐ 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.

> ☐ In the event of multiple uppermost beacons in a dual system both (System 1, System 4) must be programmed as "AOL Beacon".

> ☐ The flashhead cable is connected to TB2 and corresponds to the internal wiring diagram **and color guides on the terminal block**.

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 by 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 feet 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 inches 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 that no arcing can occur, wire colors match the terminal designations, and the 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 inches above the top of the beacon, and a minimum of 18 inches 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 OR SC 370R)

☐ 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 (RED LED SIDELIGHTS, SIDE-MARKERS, OR OBSTRUCTION LIGHTS L-810)

☐ Only Flash Technology provided **24VDC Marker Fixtures** are installed.

☐ The dome nuts of the cable strain reliefs are tightened for cable support and to prevent moisture intrusion.

PHOTODIODE

☐ The PHD 516 is connected to PCB1 (System Controller) P-1 (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 with 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, FTS 370w, and FTS 370r LED Medium Intensity Obstruction Lighting Systems with the following input voltages: 120-240VAC and 48VDC. All model variants support IR (infrared) output.

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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. This equipment can accommodate system configurations that meet the FAA AC/7460-1M, FAA AC/7460-1L, and FAA AC/7460-1K standards for marker configurations.

The equipment included in this system meets or exceeds requirements for Transport Canada CAR 621.19 (second edition) types CL-864, CL-865, and CL-864/865.

The equipment included in this system meets or exceeds requirements for ICAO Annex 14 Sixth Edition for medium-intensity obstacle lights, Types A and B.

The system meets or exceeds Agencia Federal de Aviación Civil (AFAC) requirements for Types L-864 and L-865.

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 their own expense.

PATENT INFORMATION

FH 370, described within this document, is covered by the following patent: Patent No. 8,926,148.

MKR 371 and MKR 372, described within this document, are 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 the modem or battery, if present, are covered by limited warranties (2 years for modem and battery, from the date of shipment).

PARTS REPLACEMENT

The use of parts or components in this equipment that are 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 150/5345-43J, 150/5345-53D, Engineering Brief No. 67D, and Engineering Brief 98. 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 charge 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 after turning the circuit breakers off. Under no circumstances remove or alter the wiring or interlock switches.

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1. INTRODUCTION AND OPERATION

INTRODUCTION

FTS 370d, FTS 370w, and FTS 370r are LED Medium Intensity Obstruction Lighting Systems built to be in conformance with the Federal Aviation Administration (FAA) AC 150/5345-43J which specifies the requirements for an Obstruction Lighting System in the USA. The system can also be setup to conform to the International Civil Aviation Organization (ICAO) standard and to various other regional standards.

- FTS 370d is a Dual Lighting System (red/white) for L-864/865 applications.
- FTS 370w is a White Lighting Systems for L-865 applications; while
- FTS 370r is a Red Lighting System for L-864 applications

FTS 370 series lighting systems may also be configured for Catenary operation.

- 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 and have a reduced need for service. Ease of installation and service is enhanced by simple wiring, setup, and diagnostics. Safety is further enhanced by using operating voltages of less than 60VDC.

Each Lighting System consists of one or more SC 370d, SC 370w, or SC 370r (hereafter referred to as SC 370) power and control unit(s) and an associated Flashhead (FH 370). 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. Additional SC 370s can be connected via optional GPS synchronization.

The light source for the flashhead is comprised of light-emitting diodes (LEDs). 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. The installation of FTS 370d systems (L-864/865) requiring L-810 markers is simplified by using the same cable run for both markers and flashhead. The flashhead may be located up to 850 ft. (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/notification. Robust and highly reliable communication between multiple SC 370 units is via RS-485.

SC 370 systems may be ordered configured for operation with AC or DC input power. AC systems are not sensitive to input power phase and have an operational voltage range of 120-240VAC, 50/60Hz with no modification necessary to the input power module. DC systems are configured for 48VDC. The input voltage type 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)	23.82 x 17.25 x 8.51 in. (605 x 438 x 216 mm)
Weight	39 lb. (18.1 kg)
SC 370 System Controller (Stainless Option)	
Dimensions (H x W x D)	23.00 x 17.13 x 6.44 in. (584 x 435 x 164 mm)
Weight	40 lb. (18.1 kg)
Marker Interface (Standard)	
Dimensions (H x W x D)	16.1 x 10.5 x 4.91 in. (409 x 267 x 125 mm)
Weight	10.1 lb. (4.6 kg)
Marker Interface (Stainless Option)	
Dimensions (H x W x D)	13.75 x 11.05 x 4.36 in. (349 x 281 x 111 mm)
Weight	11.7 lb. (5.3 kg)
FH 370 Flashhead	
Dimensions (H x W x D)	7.5 x 15.75 in. (191 x 400 mm)
Weight	26.3 lb. (11.9 kg)
Aerodynamic Wind Area	99.13 in^2 (639.5 cm^2)
MKR 371 / MKR 372	
Dimensions (H x W x D)	9.0 x 2.75 x 2.13 in. (229 x 70 x 54 mm)
Weight	1.6 lb. (0.7 kg)
PHD 516 Photodiode	
Dimensions (H x W x D)	4.27 x 2.02 x 1.31 in (108 x 51 x 33 mm)

Table 1.2 – Performance Specifications

Parameter	Lighting Type			
	FAA CAR 621		ICAO Type A/B Type A/C	4K White Night
	L-864/L-865 CL-864/CL-865	L-866/ L-885 CL-866/ CL-885		
Flash Intensity (ECD ± 25%)				
White Day	20,000	20,000	20,000 minimum	-
Red Night	2,000	2,000	2,000	-
White Night	2,000	2,000	2,000	4,000 nominal
Flash Rate (flashes per minute)				
White Day	40	60	20/30/40	-
Red Night	20/30/40	60	20/30/40/Stdy[2]	-
White Night	40	60	20/30/40	40
Primary Power	120-240 VAC, 50/60 Hz (3A - 1.5A Peak) +/- 48 VDC (40-60 V) (8A Peak)			
Power Consumption[3] (Watts ±5%)	IR (Non-IR)	IR (Non-IR)	IR (Non-IR)	IR (Non-IR)
White Day	70W (80W)	100W (110W)	65W (65W)	-
Red Night	40W (40W)	50W (50W)	36W (35W)	-
White Night	40W (40W)	50W (50W)	35W (33W)	39W (37W)
Environmental	Complies with FAA specifications in AC 150/5345-43J for continuous operation, which includes the following: **Temperature:** Storage/shipping: -67° to 130° F / -55° to 55° C Operating: -40° to 130° F / -40° to 55° C **Humidity:** 95% relative humidity			
Flashhead cable	Length	PN	AWG	OD-Nom	OD - Max
	6 – 375 ft.	F4210000	10AWG	0.430 in.	None
	6 – 600 ft.	F4370000	8AWG	0.565 in.	None
	6 – 850 ft.	F4206000	6AWG	0.691 in.	0.709 in.
Flashhead TECK90 cable	6 – 600 ft.	F5994000	8AWG	0.900 in.	
	6 – 850 ft.	F5994001	6AWG	1.020 in.	

NOTES:

1. For 60 fpm, enable Catenary, Middle
2. ICAO Type C, Steady on.
3. Power measurements are for IR and (non-IR flashheads)

SC 370

OPERATIONAL OVERVIEW

See Figure 1.1 below for an internal view of the SC 370. Component layout diagrams with part names and numbers are shown in Figure 6.1 – SC 370 (AC) Component Locations (page 111) and Figure 6.1 – SC 370 (AC) Component Locations (page 111). Internal wiring diagrams are shown on page 62 for AC and page 67 for DC.

Input power is connected to terminal block TB1. Mounted on TB1 is a Metal Oxide Varistor (MOV) called VR1 that 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.

A flag indicator on the 2-pole Circuit Breaker for improved operational safety 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 in single power supply configuration below).

The control PCB (PCB1) supervises system operation. A User Interface with an alphanumeric display and push buttons provides system configuration and alarm notification.
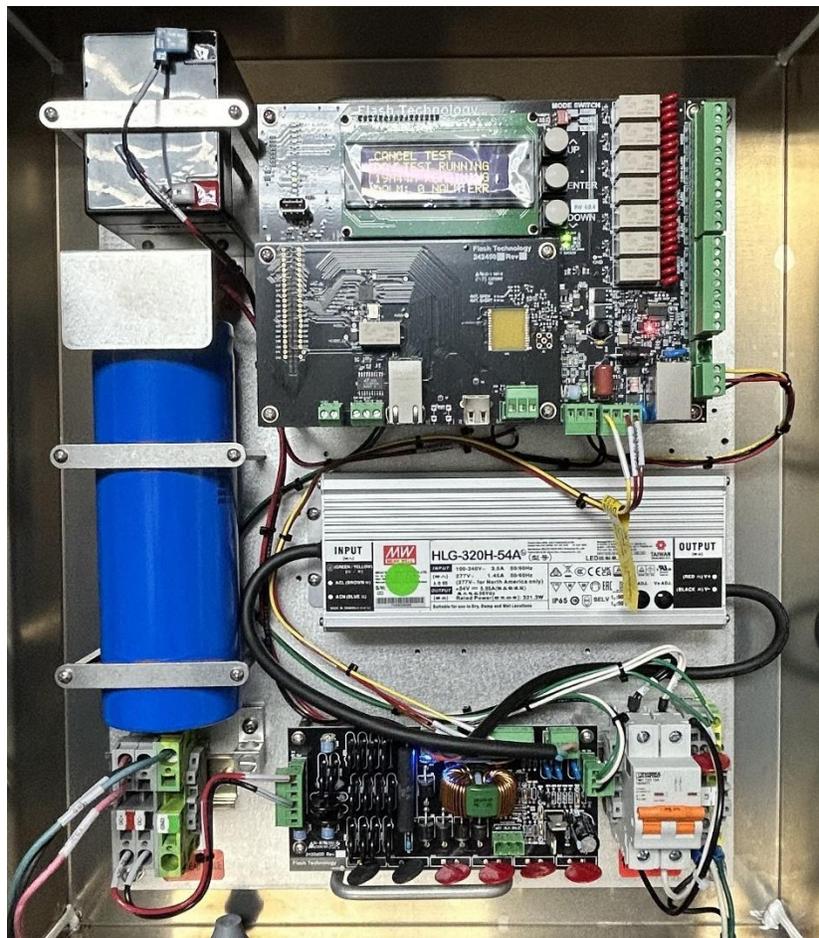
Figure 1.1 – SC 370 (AC)

PCB1 CONTROLLER BOARD

PCB1 controls and monitors the operation of the SC 370 and its associated flashhead. Each section of PCB1, outlined in the photo below, is discussed in the following subheadings.
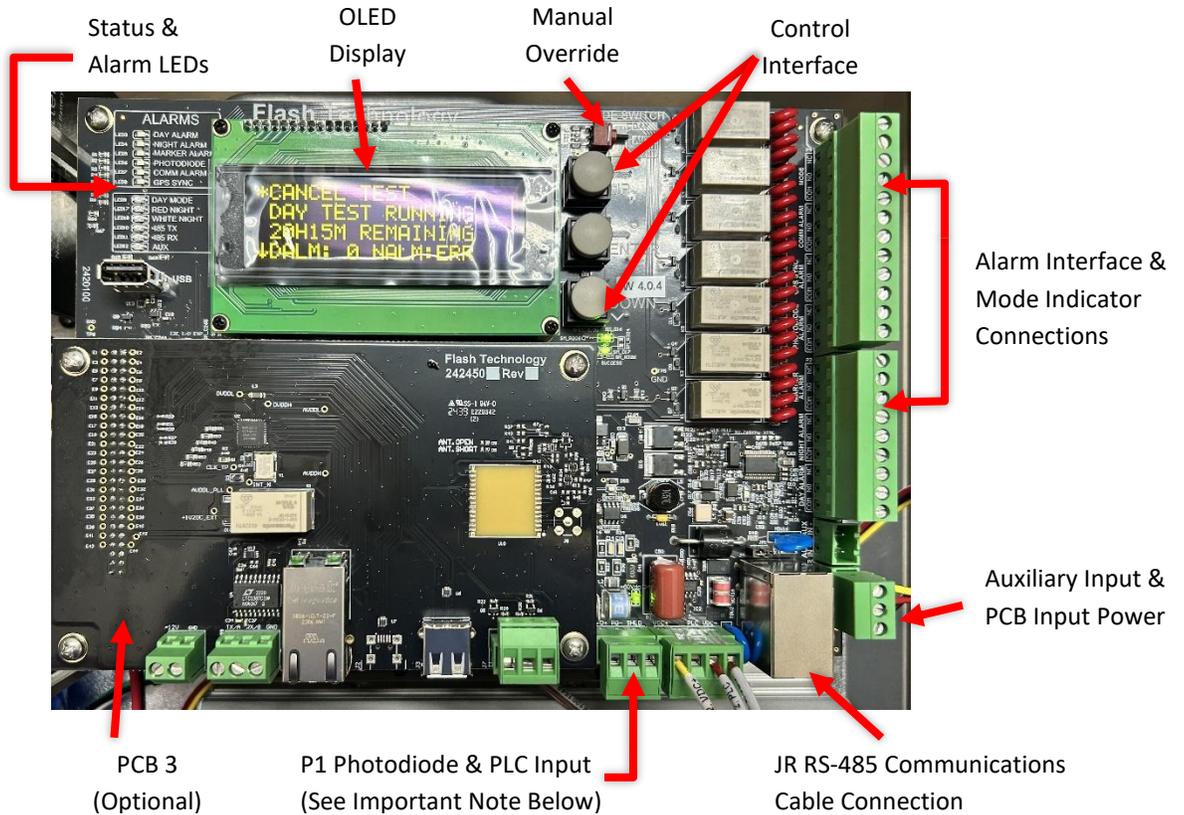
Figure 1.2 – PCB1 Controller Board

Important: Do not install or remove wires from terminal blocks or PCBs until DC voltage indicator on PCB2 has been extinguished. This applies especially to the connection at PCB1 P1. If it is necessary to remove the 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 Organic Light-Emitting Diode (OLED) display provides system status, alarm, and programming information. Three push buttons 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 denoted by the cursor position. The information display defaults to show the current system status as well as the basic configuration for the unit. Refer to Section 3 (page 71) for a detailed description of all menu functions of the information display. Refer to Table 3.3 (page 84) for a complete list of alarms provided by the information display.

Figure 1.3 – Information Display and User Interface

PHOTODIODE

The Photodiode is connected at position P1 on the PCB1 Controller Board. Terminate the white, black, and shield wires in the appropriate locations, which are called out on the controller board. The connection is polarity sensitive, so it is critical to verify the wiring as shown in Figure 2.4 to Figure 2.31 (starting on page 62).

MANUAL OVERRIDE

The Manual Mode switch, located on the controller board, provides temporary control of the system's operating mode. When the manual mode switch 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 automatically 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 powering 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 (page 22) describes the function of each LED.

Table 1.3 – Status and Alarm LEDs

NOTE: See Table 3.3 (page 84) for a complete list of alarms provided by the information display.

LED	Indication
DAY ALARM	• Red when the connected beacon is not communicating with the SC 370 in Day mode. • The Day Alarm will be accompanied by the Night Alarm and the Comm. Alarm.
NIGHT ALARM	• Red when the connected beacon is not communicating with the SC 370 in Night mode. • The Night Alarm will be accompanied by the Day Alarm and the Comm. Alarm.
MARKER ALARM	• Red if the marker interface board is not communicating with the SC 370. • The Marker Alarm will be accompanied by the Comm. Alarm.
PHOTODIODE	• Red when more than 19 hours have passed since the system has changed modes via the photodiode input.
COMM ALARM	• Red when the connected beacon is not communicating with the SC 370. • The Comm. Alarm will be accompanied by the Day Alarm and the Night Alarm
GPS SYNC	• Red when more than one hour has passed since the unit received a GPS Sync. pulse.
DAY MODE	• Continuous green when unit is in DAY mode • Blinking green when the unit is in manual DAY mode.
RED NIGHT	• Continuous green when unit is in RED NIGHT mode • Blinking green when the unit is in manual RED NIGHT mode.
WHITE NIGHT	• Continuous green when unit is in WHITE NIGHT mode • Blinking green when the unit is in manual WHITE NIGHT mode.
485 TX	• Blinking red when the unit is sending data to other units in the system.
485 RX	• Blinking red 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.

Figure 1.4 – Digi Modem LED Indicators

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	

Table 1.5 – Digi Modem LEDs

LED	Indication
POWER	• Solid Green: DC Power is connected to the device
SIM	• Solid Green: SIM1 Active (Default) • Solid Blue: SIM 2 Active • Solid Red: SIM Failure • Off: No SIM Present
LTE	• **Flashing White:** ETH port connection established and in the process of connecting to the cellular network. • **Flashing Yellow (or Orange):** In the process of connecting to the cellular network and to a device on its ETH port. • **Solid Yellow (or Orange):** Initializing or starting up. • **Flashing Green:** Connected to 2Gor 3Gand is in the process of connecting to any device on its ETH port, or nothing is connected to the port. • **Flashing Blue:** Connected to 4GLTE and in the process of connecting to a device on its ETH port • **Solid Blue:** Connected to the 4GLTE and has a device link to its ETH port • **Alternating Red/Yellow (or Orange):** Upgrading firmware
SIGNAL	1 Bar: Very Weak 2 Bars: Marginal 3 Bars: OK 4 Bars: Good 5 Bars: Excellent

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 shown in **Figure 1.5** and listed in **Table 1.6**. 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.
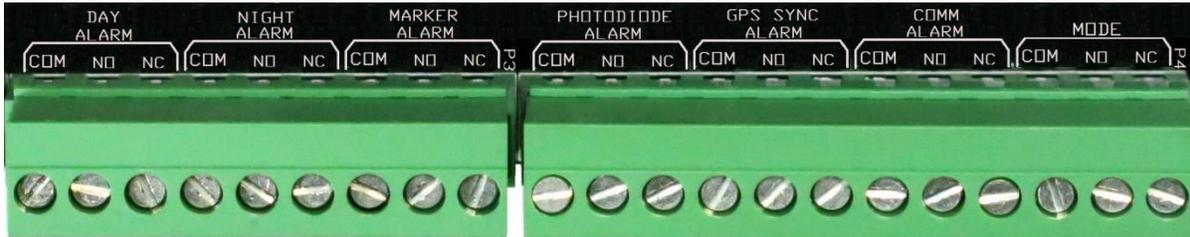
Figure 1.5 – Alarm Interface and Mode Indicator Connections

Table 1.6 – 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.
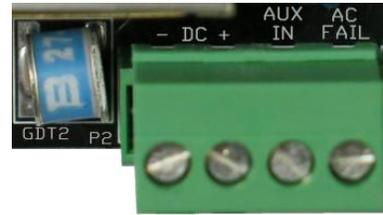
Any unused dry contact may be reassigned to provide confirmation that the system is operating normally while the beacon output is inhibited. See Figure 1.4 (page 23) and Table 1.5 (page 23) for available dry contacts.

Auxiliary Input configuration programming is located in the "Site Tower Configuration" menu of the controller programmed as System 1. See Site Tower Config (page 72) 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 Auxiliary Input (page 73) and Technical Bulletin "SC 370 SMART Modbus interface" (PN 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 System 1 and secondary 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 secondary unit. Either port may be utilized as an input to or output from PCB 1. See Communication Cable Kit (page 35) for additional connection and cable routing information.
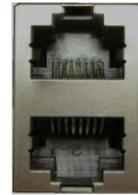
PCB3 SMART BOARD

The optional PCB3 "Smart Board" (PN F2424500) 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 F2424501), shown in Figure 1.6 (page 26), 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 GPS Sync Kit (PN F1370185) includes instructions and all components necessary for installation. Antenna installation instructions are provided in GPS Antenna (page 33) for systems ordered with GPS Sync factory installed.

Two LEDs, Antenna Open (ANT. OPEN) and Antenna Short (ANT. 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 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 adapter. See USB Firmware Update (page 84) for additional information regarding this feature.
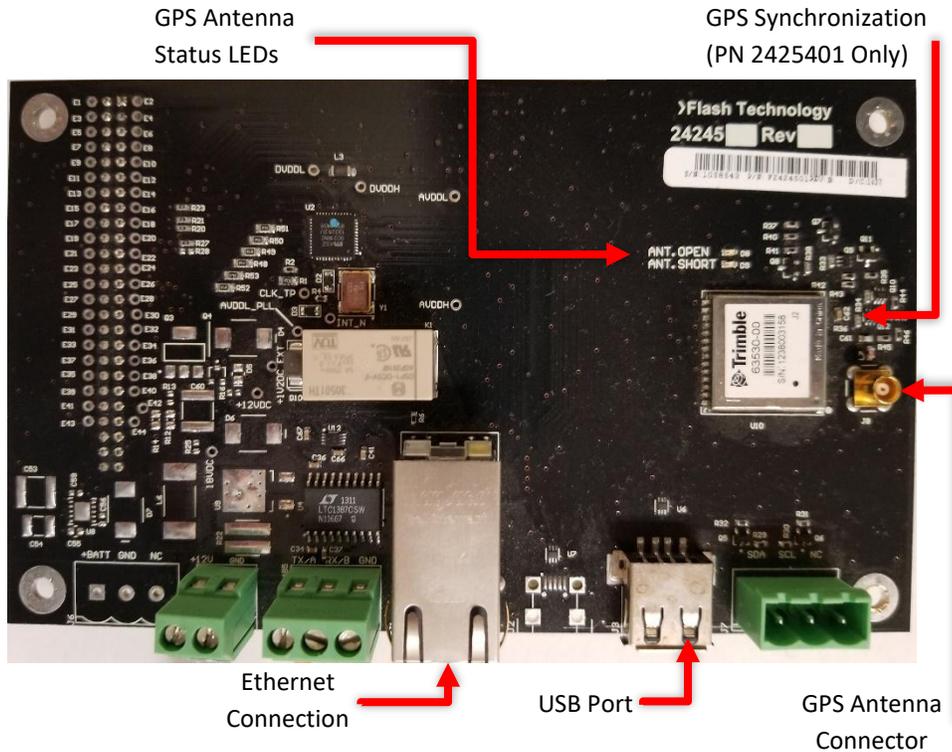
Figure 1.6 – PCB 3 with GPS

PCB2 SURGE BOARD

The PCB2 "Surge Board" (AC PN F2420600, DC PN F2420601) is installed at 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 1.7 (page 27), has a Power LED that illuminates to indicate the system is operating with full DC Voltage output (58 VDC). If AC power is removed from the system, the LED will turn off after approximately 5-10 seconds, indicating a full voltage discharge. It is important to verify that 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, formerly at connector P6 on the PCB2 surge board, now connects to the system controller at position P1.

If a replacement of the surge board 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.

58 VDC Output to TB2

Power LED

58 VDC Input from Power Supply(s)

Wire Harness Connects to PCB1

ACV Output to Power Supply(s)

ACV Input from TB1
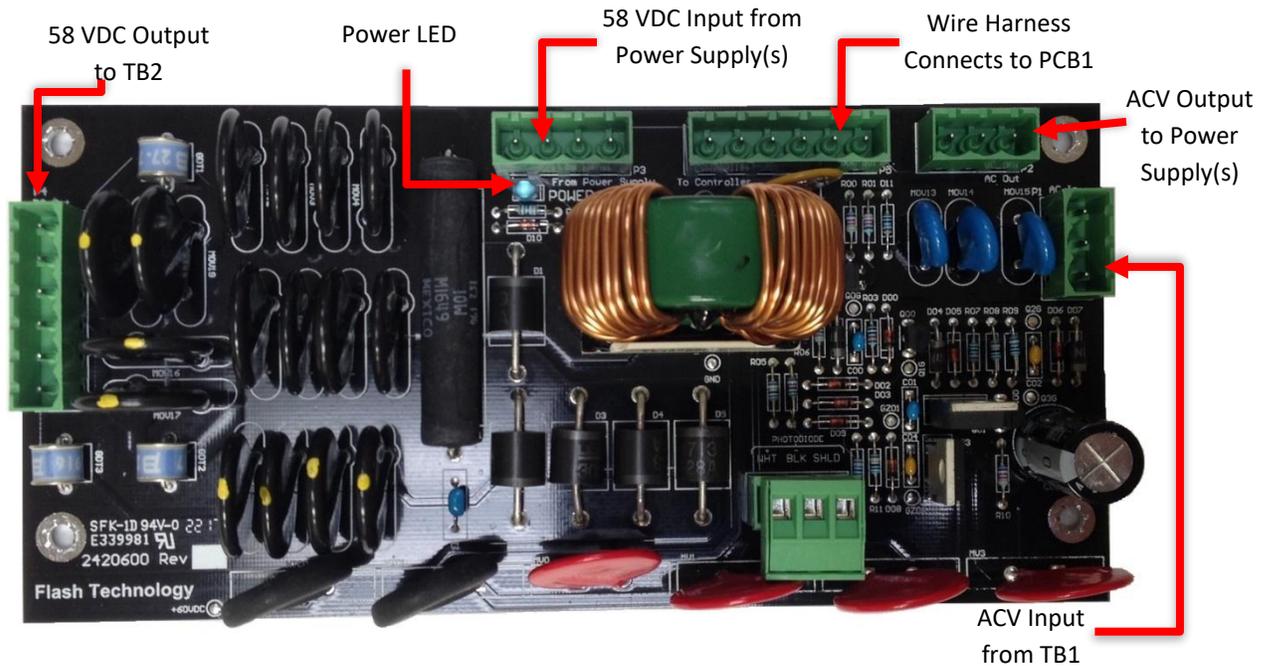
Figure 1.7 – PCB2 Surge Board (PN F2420600 or F2420601)

(Direct replacement for PN F2420500 or PN F2420501)

FH 370D/W/R

FH 370d/w/r, shown in Figure 1.8 (page 28) , is divided into two parts: light engine and base assembly.

The light engine is comprised of highly efficient LEDs that are focused by Fresnel optics to produce the required light intensity 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. ICAO, CAR621, and 4000 Candela White Night versions are also available[1].

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 the input to the light engine.

FH 370d and FH 370r flashheads incorporate IR emitters to ensure visibility of the obstruction to pilots aided by night vision goggles (NVG). Flashheads that contain IR emitters are identified by the use of a red core board within the light engine. In addition, there is an "IR" sticker on the saucer as seen in Figure 1.8 (page 28). The combination of standard Red (620 nm) LEDs and IR (850 nm) LEDs ensures maximum visibility to pilots in all circumstances and meets AC 150/5345-43J specifications.

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[1] The certification standards needed must be specified when ordering a flashhead or replacement light engine.

Figure 1.8 – 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 2.14 (page 49; Stainless Steel option shown in Figure 2.16, page 51) and the wiring diagram is shown in Figure 2.32 (page 70).

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.

The Marker Interface PCB (red board) is equipped with a switch. For AC 150/5345-43J compliance, the switch is placed in "On" (up) position. If using one or more legacy markers (MKR 370), the switch is placed in the "Off" (down) position. Previous versions of this PCB (black board) do not have the switch and will only work with legacy markers.

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.
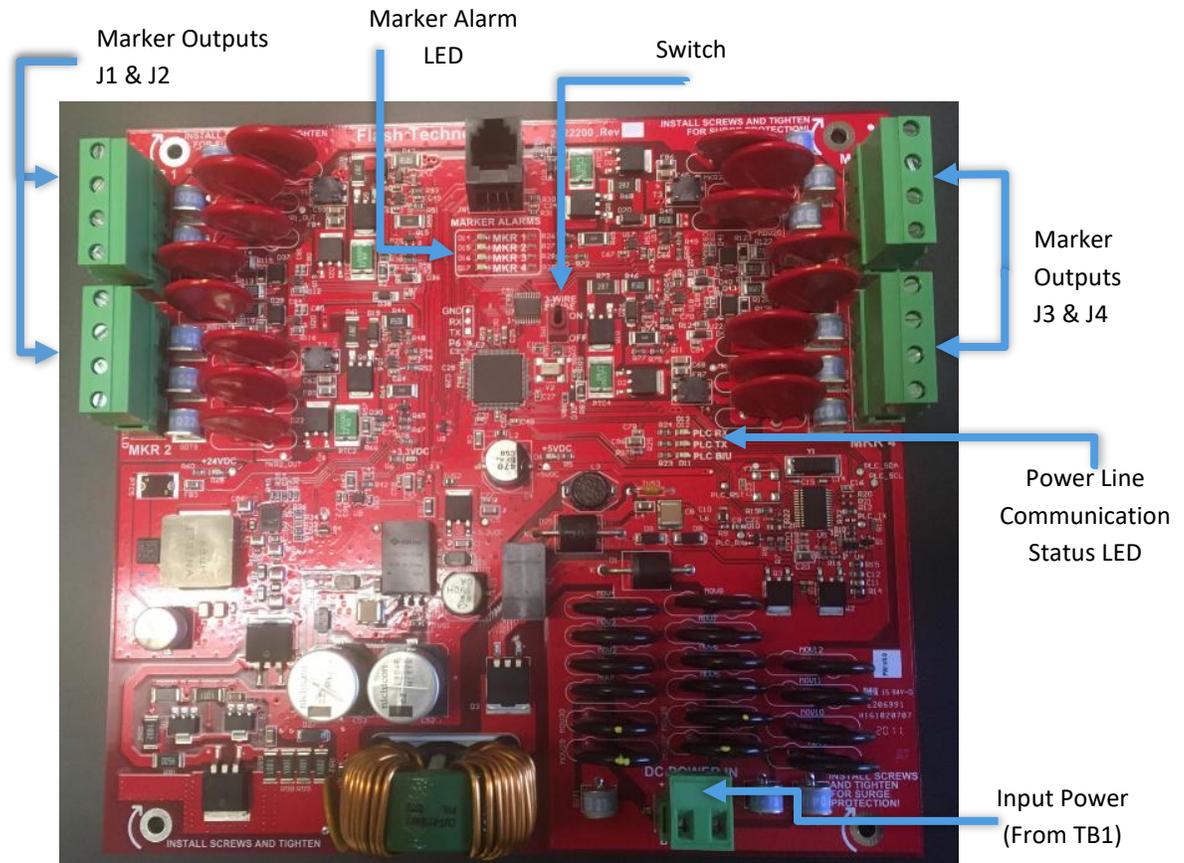
Figure 1.9 – Marker Interface PCB

MKR 372 (SC 370D L-864/865 ONLY)

MKR 372 DC, shown in Figure 1-10 (on right), is a 24 VDC LED L-810 marker. The innovative design combines three (3) highly efficient Red LEDs, three (3) IR LEDs, and Fresnel optics into a compact cast aluminum base, which is easy to install, requiring minimal hardware. The addition of an IR (850 nm) LED to the existing Red (620 nm) LED ensures maximum visibility of the obstruction to pilots in all circumstances.

Operational power is supplied through the Marker Interface Enclosure discussed in the previous section. A mounting diagram for the MKR 372 is provided in Figure 2.14 (page 49). Complete installation diagrams and instructions are provided with the marker kit.

NOTE: Legacy MKR 371 can be used in place of MKR 372 if IR markers are not required. The Switch on the Marker Interface PCB must be set to the appropriate setting.

NOTE: Refer to "Vanguard® Marker Installation" (PN F7904214) for specific information regarding cable connection to the MKR 372.

Figure 1.10 – MKR 372

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
    - PN F1370990
    - Double-eye Support Grip
    - Small Slot Screwdriver
    - "T" Level
- 1/8-inch Non-flared Flat Blade Screwdriver
- 9- or 12-inch, #2 Flat Blade Screwdriver
- #2 Phillips® Head Screwdriver
- Set of Combination Wrenches
- Assorted nut driver handles: 1/4-inch
    - 5/16-inch, 3/8-inch recommended
- Long-nose Pliers
- Wire Strippers
- Digital Volt-ohm Meter
- Level
- Cable Ties
- Tin Snips
- Camera (for documentation)

CONTROLLER INSTALLATION

Warning! Read the Personnel Hazard Warning (page 7) 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 secondary unit installed in the system. See Section 3 (page 71) for a detailed description of the menu and all functions of the information display.

SC 370 ACCESS

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

NOTE: The optional stainless steel enclosure is secured with latches.

MOUNTING

The SC 370 enclosure mounting outline and dimensions are shown in Figure 2.9 (page 44; Stainless Steel option shown in Figure 2.10, page 45). 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 inches separation between enclosures).

MOUNTING ADAPTER PANEL (OPTIONAL)

The optional Mounting Adapter Panel, shown in Figure 2.11 (page 46), allows for easier installation of the FTS 370 system by removing the need to modify 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 Inside Sales at 1-800-821-5825 if this option is desired.

WIRING

Typical E1/D1 & E2/D2 component location diagrams are shown in Figure 2.17 (page 52) and Figure 2.18 (page 53). A D1/D2 system wiring diagram is shown in Figure 2.21 (page 56) and an E1/E2 wiring diagram is shown in Figure 2.22 (page 58). A typical Catenary component location diagram is shown in Figure 2.20 (page 55) with a wiring diagram shown in Figure 2.23 (page 60). Installation notes for system types shown are located after each figure. Installation instructions concerning MKR 371/MKR 372 L-810 marker fixtures are supplied with the marker kit. The system installation diagrams provided in this manual may not contain all the required wiring information for installation at your site.

> **Important! If installation drawings prepared specifically for your site disagree with the 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 the 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 with both this manual and 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 lightning 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 is connected at position P1 on the PCB1 Controller Board. 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 at any practical distance from System 1. The standard photodiode (PN F1855516) is supplied with 20 ft. of cable. Photodiodes with cable lengths up to 75 ft. are available. Do not splice this cable.

PHOTODIODE MOUNTING

The photodiode, also referred to as PHD 516, is shown in Figure 2.1 (page 34) and mounting and outline dimensions are shown in Figure 2.12 (page 47). The photodiode uses a female 1/2-inch 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 (PN F1905355). It must not be mounted underneath the controller, where it will be shadowed.
- Ensure that the installation is watertight.

    NOTE: See Cellular Antenna below and GPS Antenna (page 33) 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 (page 34). The supplied antenna mounting bracket accommodates bulkhead mount style antenna as shown in Figure 2.2 (page 34). 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 Figure 2.26 (page 64) and Figure 2.31 (page 69). 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. 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-inch 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 (page 34).

NOTE: The antenna must be mounted outdoors to ensure optimal reception. See Photodiode Mounting (page 32) and GPS Antenna below 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:
   a. Wall Mount: Use screws (not included) to mount to the outside wall of a shelter.
   b. Horizontal Unistrut Mount: Use spring-nuts (not included) to mount to Unistrut.
   c. Vertical Pole or H-frame post Mount: Use 3-inch U-bolt (included) to mount to pole or H-frame post. The bracket permits use of larger U-bolts, up to 5 inches.
      > **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 Figure 2.1 and Figure 2.2 (page 34). Follow the location recommendations noted in Photodiode Mounting (page 32) 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 (page 34), is required with the GPS-enabled PCB3 Smart Board shown in Figure 1.6 (page 26). 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. 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 (page 34).

   > **NOTE:** See Photodiode Mounting (page 32) and Cellular Antenna (page 32) for additional considerations when selecting a mounting location for the Antenna Mounting Bracket.

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

      > **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.**

3. Mount the GPS antenna onto the mounting bracket using its large mounting nut.
4. Connect the antenna cable connector to the GPS antenna.
5. Secure the antenna cable to the mounting structure using cable ties.
6. Coil up any unused antenna cable inside the SC 370 enclosure. The diameter of the coil should be as large as possible.
7. Tighten the cable strain relief on the bottom of the SC 370 enclosure securely.
8. Verify that neither LED, ANT. OPEN or ANT. SHORT, shown in Figure 1.5 (page 24), are lit once system power is restored. See GPS Sync Kit for additional information regarding the ANT. OPEN and ANT. SHORT LEDs.

PHD 516

Cellular
Antenna

GPS
Antenna
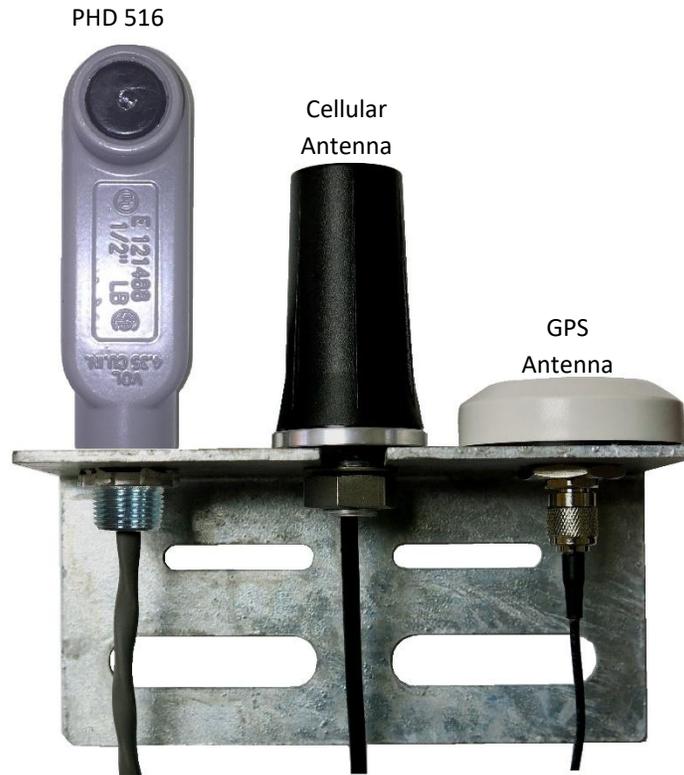
Figure 2.1 – Antenna Mounting Bracket with PHD 516, Cellular, and GPS Antennas

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.	Use spring-nuts to mount to Uni-strut.	Use 3-inch U-bolt (*included*) to mount to pole or H-frame post.
(Screws are not included in the kit)	*(Spring nuts are not included in the kit)*	The bracket permits the use of larger U-bolts, up to 5 inches.
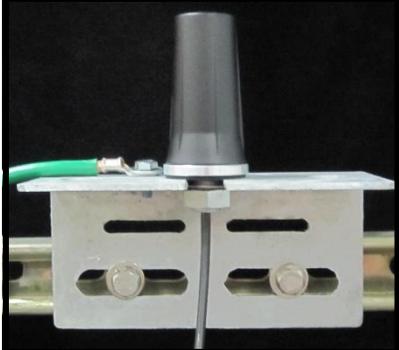
Figure 2.2 – Antenna Mounting Options

COMMUNICATION CABLE KIT

A CAT 5 cable provides the RS 485 communications link between the SC 370 designated as System 1 and all secondary 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 (PN F4362039) is supplied with each complete SC 370 system. Each kit consists of a cable and two strain relief connectors with inserts for the cable. Install one strain relief in System 1 and the other in System 2. Follow the method below for routing the cable if flexible conduit is not used for the installation.

1. Install the 3/4-inch cable strain relief on the enclosure.
2. Install the connector insert over the cable with the 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 (page 36) provides a pictorial of the installation. Connection to the Wi-Fi access point is discussed in Section 4 (page 86).

1. Locate the following items supplied with the SC 370 system:
    a. Wi-Fi Antenna (PN F5905131)
    b. Shielded CAT 5 Cable 6 ft. (PN F4362028)
    c. Antenna Mounting Kit (PN F1370191)
        • Conduit Hub with Lock Ring
        • Conduit Nipple 0.75 x 12 in.
        • Coupling
        • Cable Strain Relief
        • Custom Insert (Cable Strain Relief)
        • Two (2) Adjustable Clamp 1-1/16 to 2 in.
2. Attach the conduit hub to one end of the 12-in. 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-in. hole on the SC 370C unit and install the antenna assembly. See Figure 2.9 (page 44) 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.

SC 370 Enclosure (Bottom View)

Conduit Hub (PN F5991618)

Conduit Nipple 3/4 x 12 in. (PN F5990290)

Wi-Fi Antenna (PN F5905131)

Conduit Nipple 3/4 x 12 in. (PN F5990290)

Adjustable Clamp 1-1/16 to 2 in. SS (PN F5990253

Conduit Coupling 3/4 in. (PN F5991885)

Cable Strain Relief 3/4 in. NPT (PN F4900156), with Custom Insert (PN F5362009)

Remove to Install GND wire

Install GND wire from Antenna to Site GND

Shielded CAT 5 Cable (PN F4362028)

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 below).

Must have PCB3 Smart Board (PN F2424500 or F2424501) 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 (page 86).

The adaptor can be purchased directly from Flash Technology using PN 5905233.
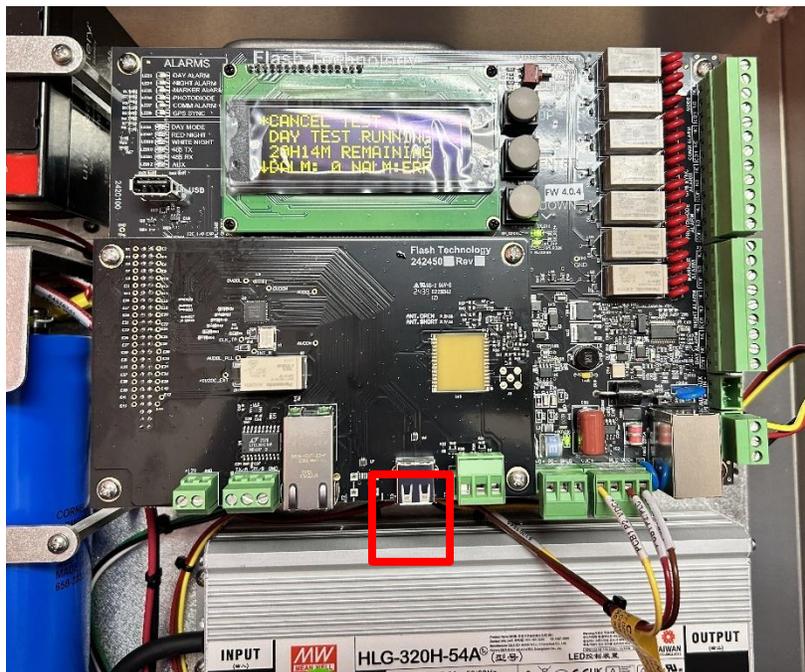
Figure 2.4 – USB Wi-Fi Installation

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 (page 23) and shown in Figure 1.4 (page 23). 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 below.

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. 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.
    c. Remove approximately 3/4 inch from the jacket of each individual connector.

2. Loosen the dome nut of the 3/4 inch 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 ft. 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 (2) full turns of 2-inch Scotchrap™ #50 tape (F5900905), or the equivalent, around the cable and tower leg.

2. Wrap three (3) full turns of 1-inch Scotchrap™ Filament #890 tape (F5900906), or the equivalent, over the Scotchrap™ #50 tape.
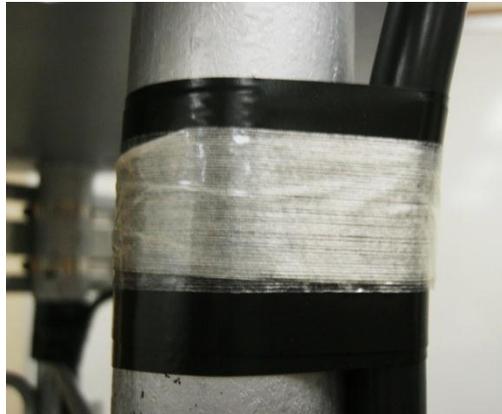
3. Wrap four (4) full turns of 2-inch Scotchrap™ #50 tape, or equivalent, over the Scotchrap™ Filament #890 tape.

4. Ensure there is at least a 4 to 5 ft. (1.5 m) 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 as shown in the picture on the following page.

MARKER INTERFACE ENCLOSURE (FTS 370D L-864/L/865 ONLY)

NOTE: Complete instructions for installing the Marker Interface Enclosure, marker mounting brackets, and MKR 371/MKR 372 L-810 markers are provided with the marker kit. Refer to "Vanguard® Marker Installation" (PN F7904214) for specific information regarding cable connection to the MKR 371/MKR 372.

Wiring information is provided in the following steps. Figure 2.6 (page 41) shows the Marker Interface Enclosure with three (3) markers connected. Figure 2.22 (page 58) shows a system installation diagram. Figure 2.32 (page 70) 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 F7790107 or F7790108).

WIRING PROCEDURE

1. Observing the procedures described previously in Flashhead Cable (page 38) and Securing the Cable: 2-3-4 Tape Method (page 39), install a 5 ft. 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.
    c. Remove approximately 3/4 inches from the jacket of each individual connector.
3. Loosen the dome nut of one of the 3/4-inch 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 1/2-inch cable strain reliefs located in the bottom of the enclosure. Insert 12 inches 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.

    NOTE: Do not connect the bare drain wire in the MKR base. Instead, cut off the excess drain wire and protect the cut end with a wire cap.

9.   Repeat steps 4-8 for the remaining markers to be installed.

10. Using at minimum, an 8 AWG wire, ground the enclosure to the tower utilizing the ground lug located to the left of TB1 on the backplate. Avoid sharp bends in the ground wire (bends must be greater than 90 degrees). Flash Technology recommends running the ground wire down and away from the enclosure.

    Important! Flash Technology recommends coating all exposed ground connections with a corrosion inhibitor (NO-OX or equivalent).

11. Install the flashhead cable from the marker interface enclosure to the FH 370d by repeating steps 1-3.

    NOTE: Install a 5 ft. service loop for each flashhead cable section (SC 370d to Marker Interface and Marker Interface to FH 370d) near the marker interface enclosure
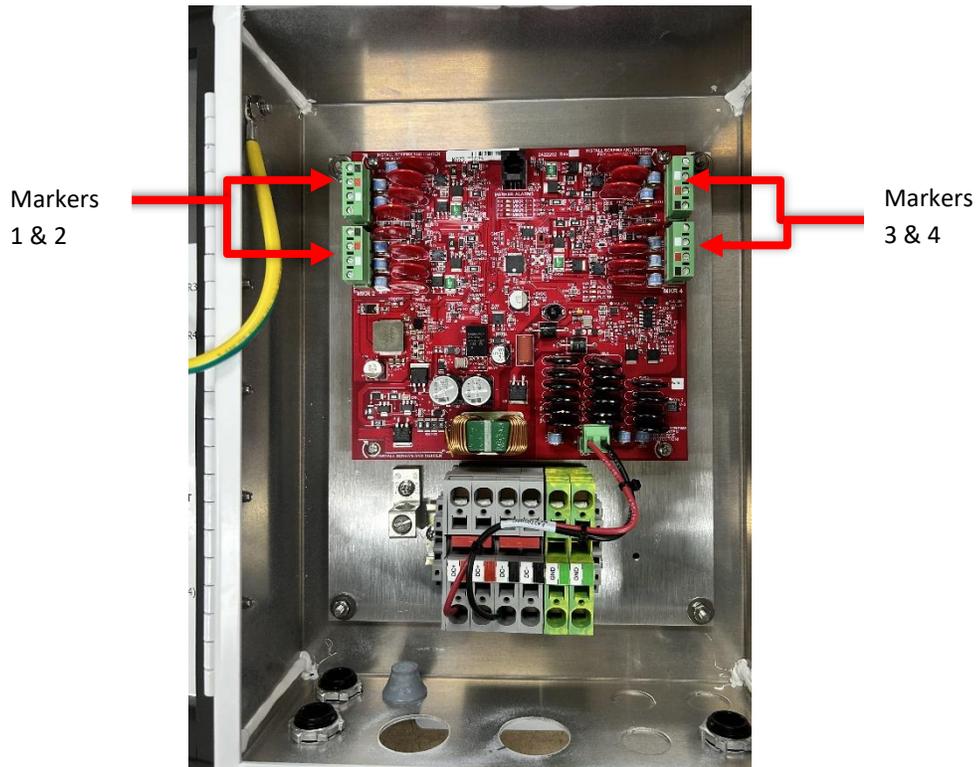
Figure 2.6 – Marker Interface Wiring

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 inches above the height of the flashhead and a minimum of 18 inches horizontally away from the flashhead.

Mount the flashhead to the tower pedestal utilizing 1/2 inch galvanized or stainless steel hardware. Four (4) mounting holes are provided on the flashhead base (Figure 2.13, page 48). 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 1/2-inch stainless steel or galvanized hardware (PN F5991777).
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 PN 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 ft. 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.
   c. Remove approximately 3/4 inch from the jacket of each individual connector.
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. Flash Technology recommends coating all exposed ground connections with a corrosion inhibitor (NO-OX or equivalent).**
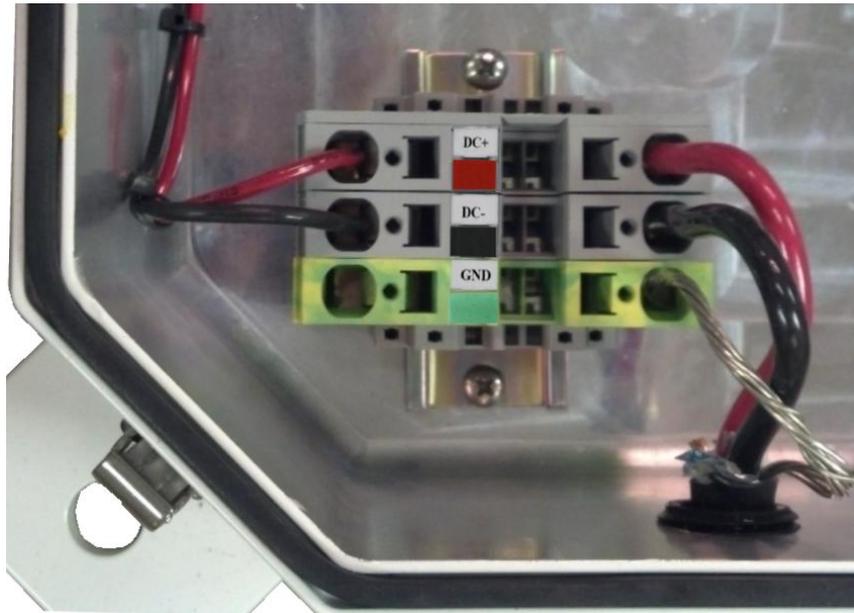
Figure 2.8 – Flashhead Cable Terminal Block

18.13 (460.50)

14.00 (355.6)

9.75 (247.65)

8.10 (205.74)

23.48 (596.39)

22.24 (564.9)

Ø0.50 (8 PLACES)

ENCLOSURE
FRONT VIEW

ENCLOSURE
SIDE VIEW

HINGE

C C C   B B A
A   A   B B B

A

ENCLOSURE
BOTTOM VIEW

KNOCKOUT TABLE (ALL HOLES KNOCKOUT FROM INSIDE)		
LETTER	KNOCKOUT SIZE	QTY
A	0.875 (22.4) DIA	7
B	1.093 (27.76) DIA	2
C	1.375 (34.93) DIA	3
SHADED HOLES REPRESENT KNOCKOUTS TO BE COMPLETELY REMOVED		
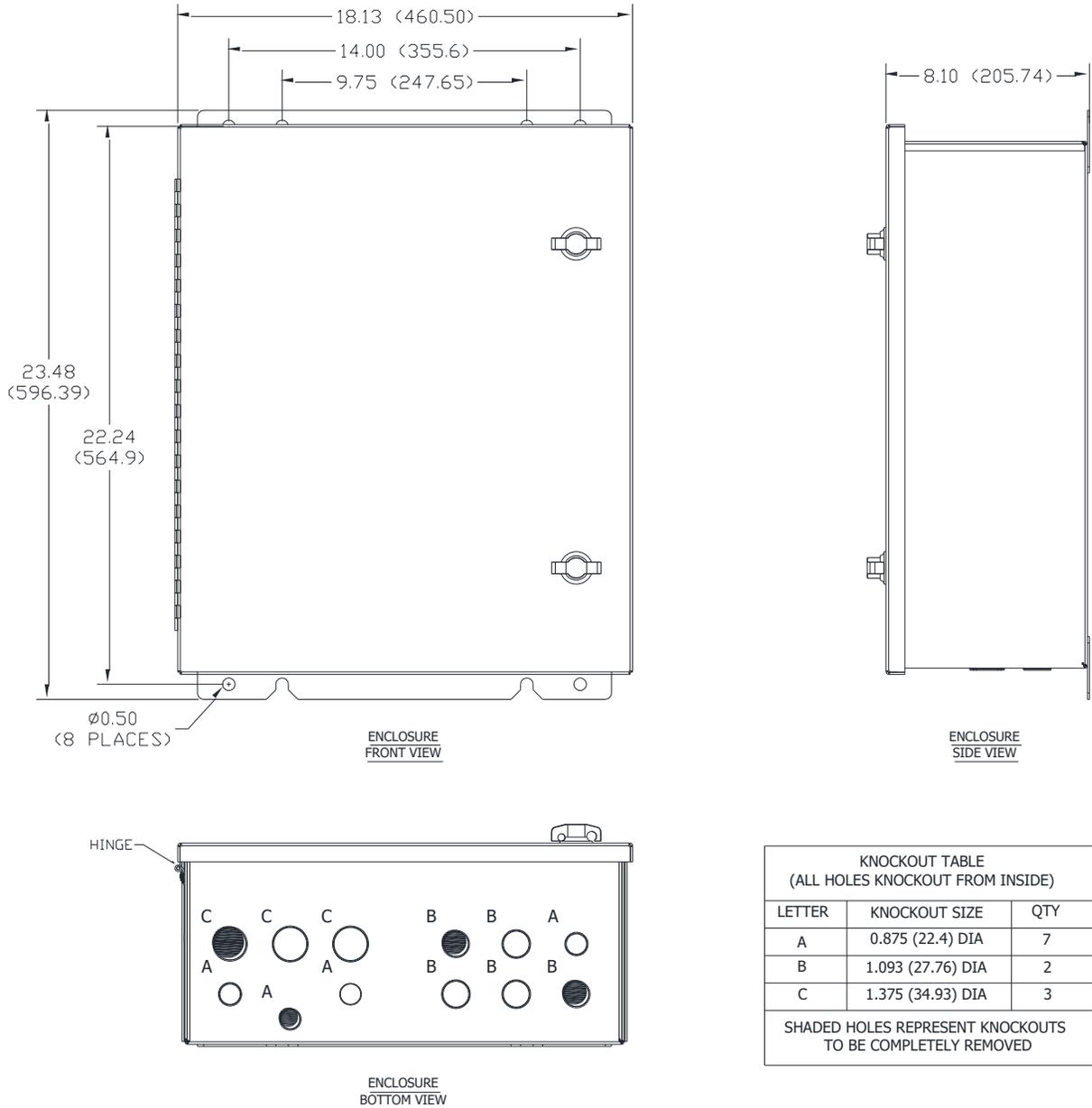
NOTE: All dimensions are in inches (millimeters).

Figure 2.9 – SC 370 Mounting and Outline (Painted Aluminum Option)

6.44
(163.6)

12.25
(311.2)

2.25
(57.2)

.62
(15.8)

21.75
(552.5)

SEE DETAIL A

Ø.44
(11.2)

.44
(11.2)

DETAIL A

6.00
(152.4)

.00

16.75
(425.5)

HOLE LEGEND		
SYM	HOLES	QTY
A	DIA. 0.880	4
B	DIA. 1.093	8

NOTE: All dimensions are in inches (millimeters).

Figure 2.10 – SC 370 Mounting and Outline (Stainless Steel Option)

14.5 (368.3)
'OPTIONAL PANEL MTG.'

12.25 (311.2)
'DUAL LED PC' & 'XENON PC'

12.76 (324.1) 'FTW'

14.75 (374.7) 'FTM / SMALL FLC'

21.75 (552.5) 'DUAL LED PC'

15.47 (392.9) 'XENON PC' & 'OPTIONAL PANEL MTG.'

8.00 (203.2) 'FTW'

10.00 (254) 'FTM / SMALL FLC'
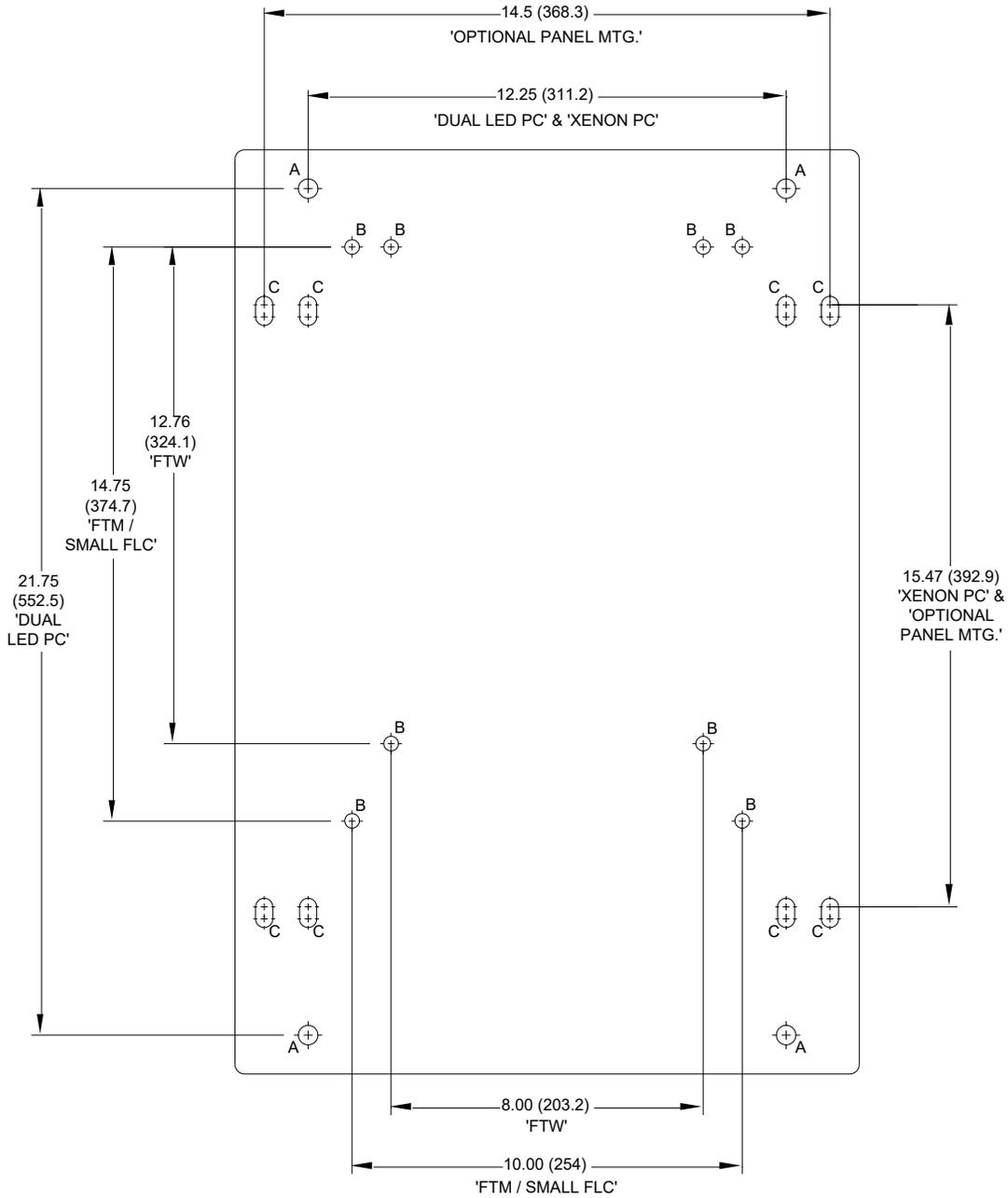
HOLE CHART		
LETTER	HOLE SIZE	QTY
A	0.50 (12.7) DIA THRU	4
B	0.38 (9.7) DIA THRU	8
C	0.44 (11.2) X 0.75 (19.1) LG SLOT THRU	8

NOTE: All dimensions are in inches (millimeters).

Figure 2.11 – Mounting Adapter Panel Mounting and Outline (Optional)

2.02
(51.308)

1.31
(33.274)

4.27
(108.458)

1/2" NPT
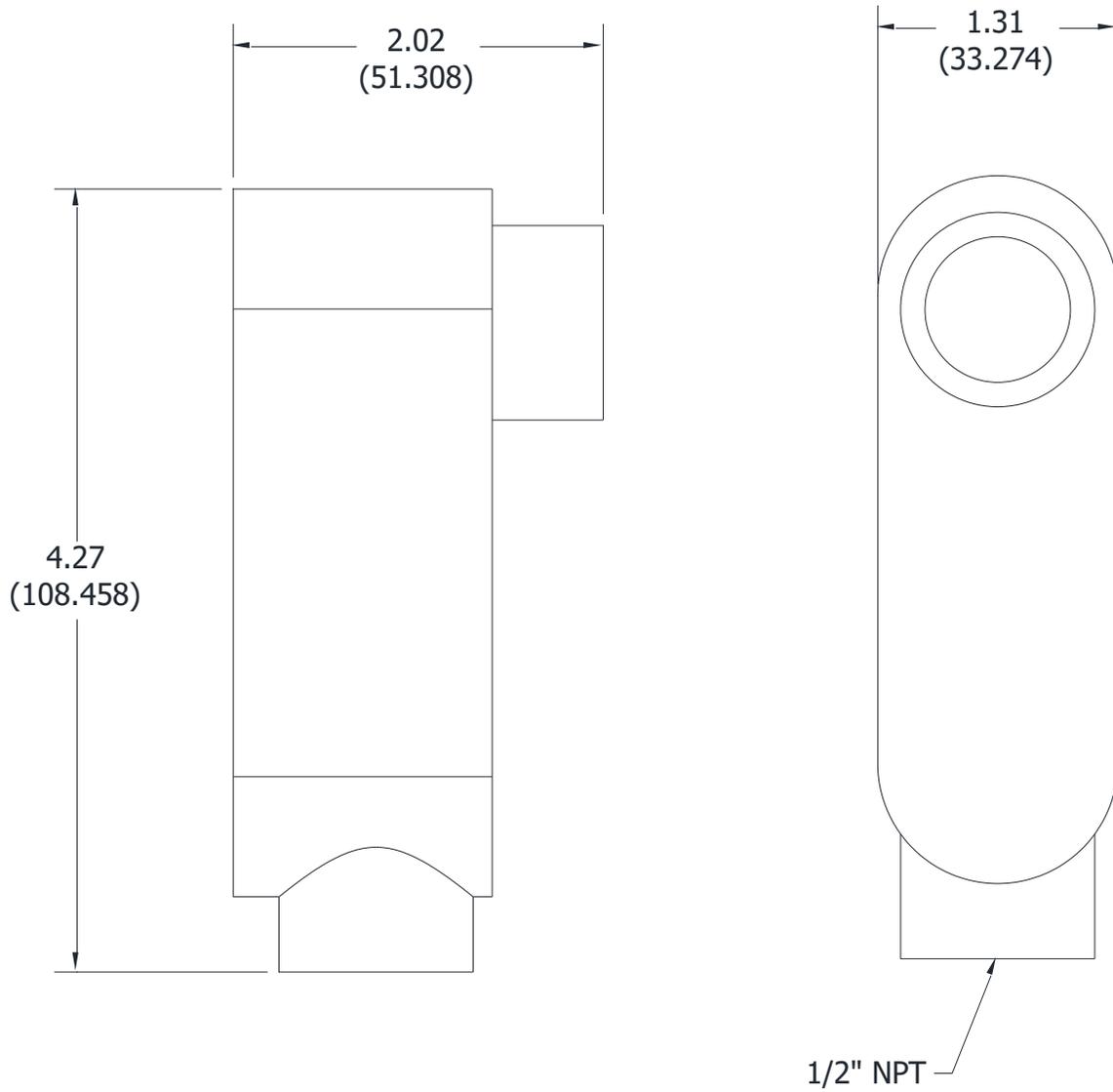
NOTE: All dimensions are in inches (millimeters).

Figure 2.12 – Photodiode Mounting and Outline

15.75 (400)

7.5 (190.5)

ATTENTION ⚠
EQUIPMENT BASE MUST HAVE
CLEAN METAL BOND TO
GROUNDED STRUCTURE

Ø 13.25 (336.5)

Ø0.63 (16) THRU
(TYP OF 4)
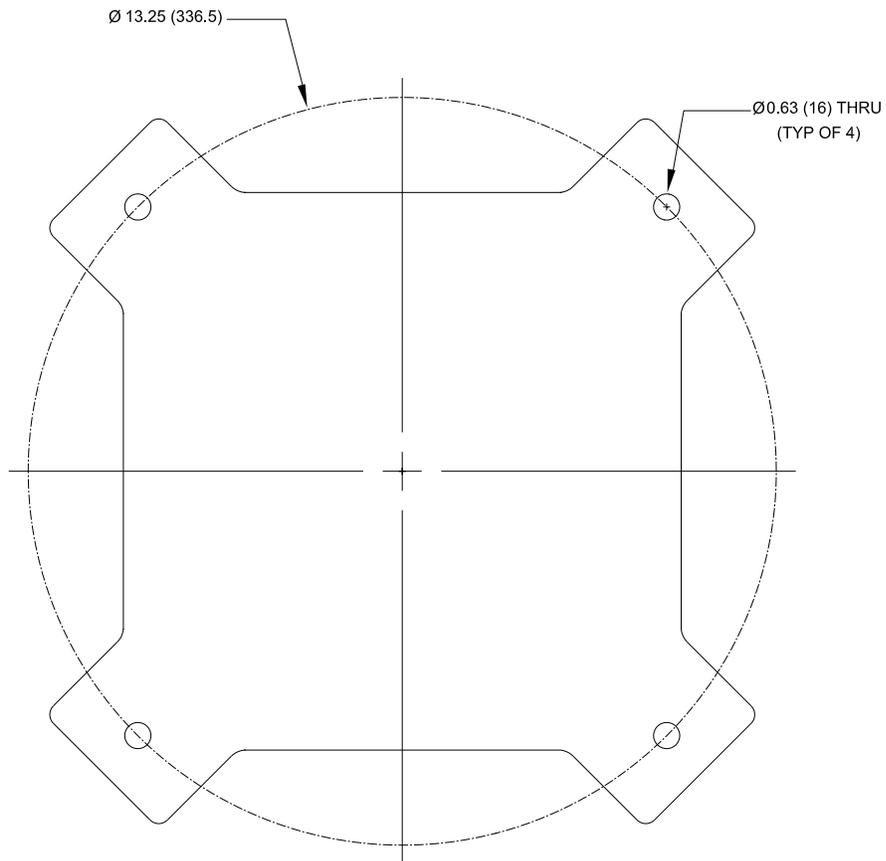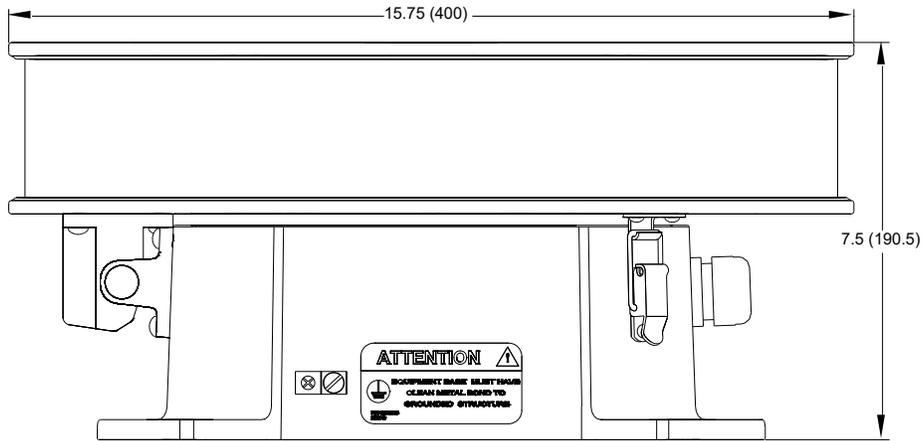
NOTE: All dimensions are in inches (millimeters).

Figure 2.13 – Flashhead Dimensions and Mounting Outline
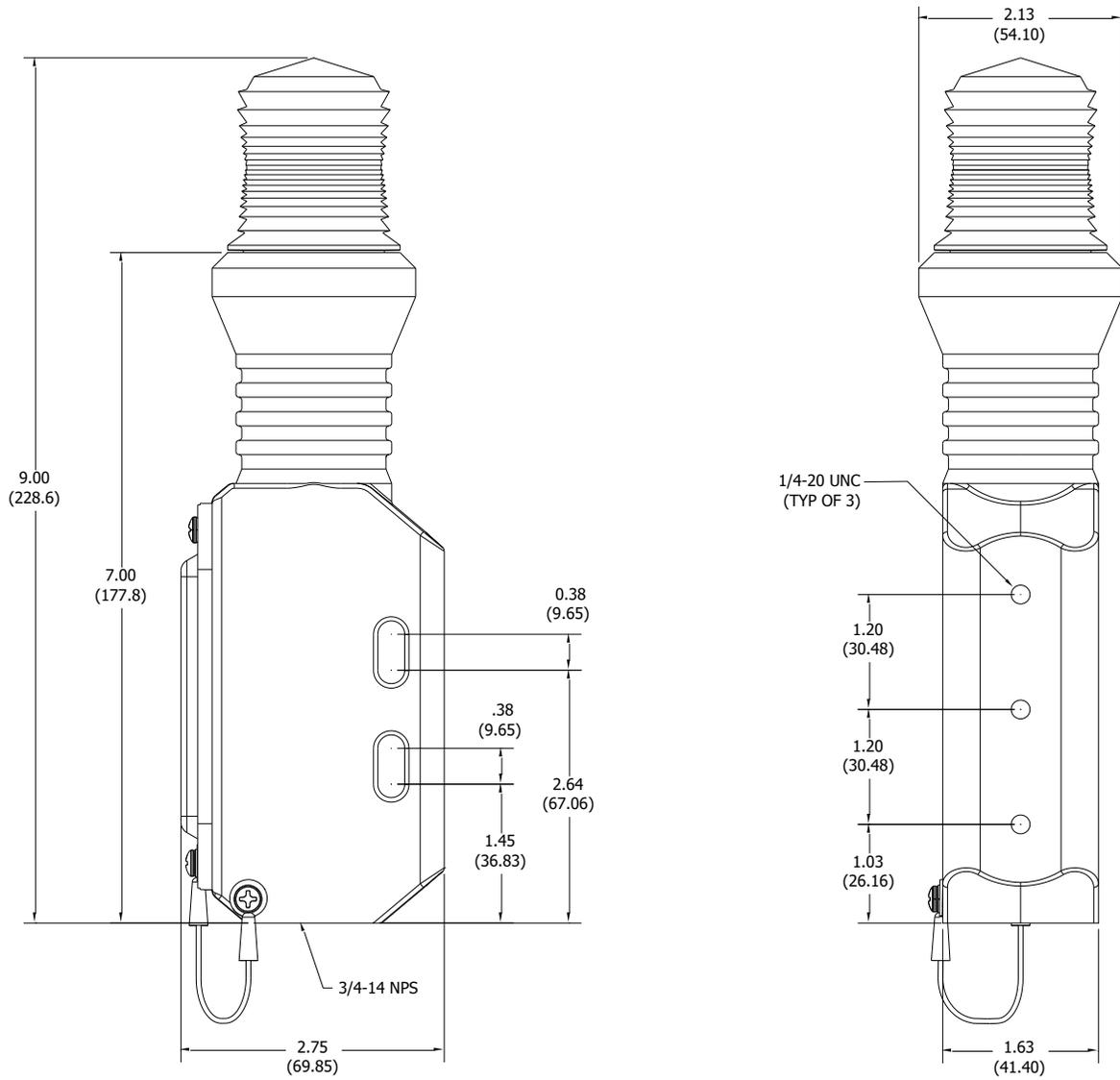
NOTE: All dimensions are in inches (millimeters).

Figure 2.14 – MKR 371 / MKR 372 Mounting and Outline

ENCLOSURE
FRONT VIEW

ENCLOSURE
SIDE VIEW

HINGE

ENCLOSURE
BOTTOM VIEW

KNOCKOUT TABLE (ALL HOLES KNOCKOUT FROM INSIDE)		
LETTER	KNOCKOUT SIZE	QTY
A	0.875 (22.4) DIA	7
B	1.375 (34.93) DIA	2
SHADED HOLES REPRESENT KNOCKOUTS TO BE COMPLETELY REMOVED		
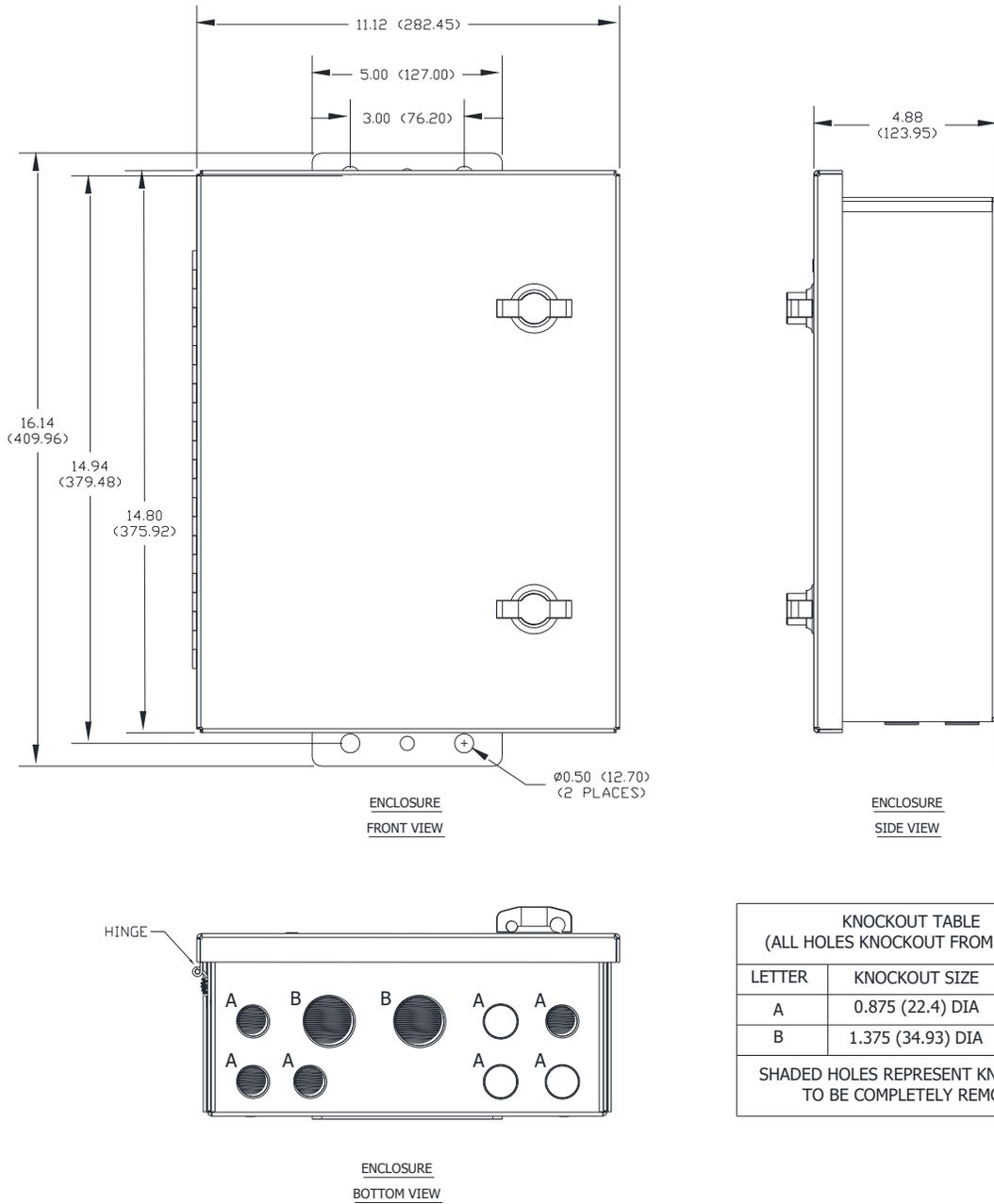
NOTE: All dimensions are in inches (millimeters).

Figure 2.15 – Marker Interface Mounting and Outline (Painted Aluminum Option)
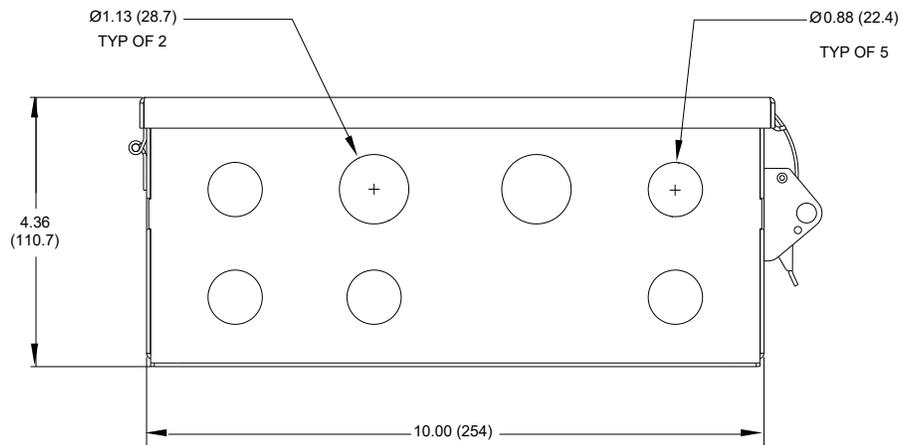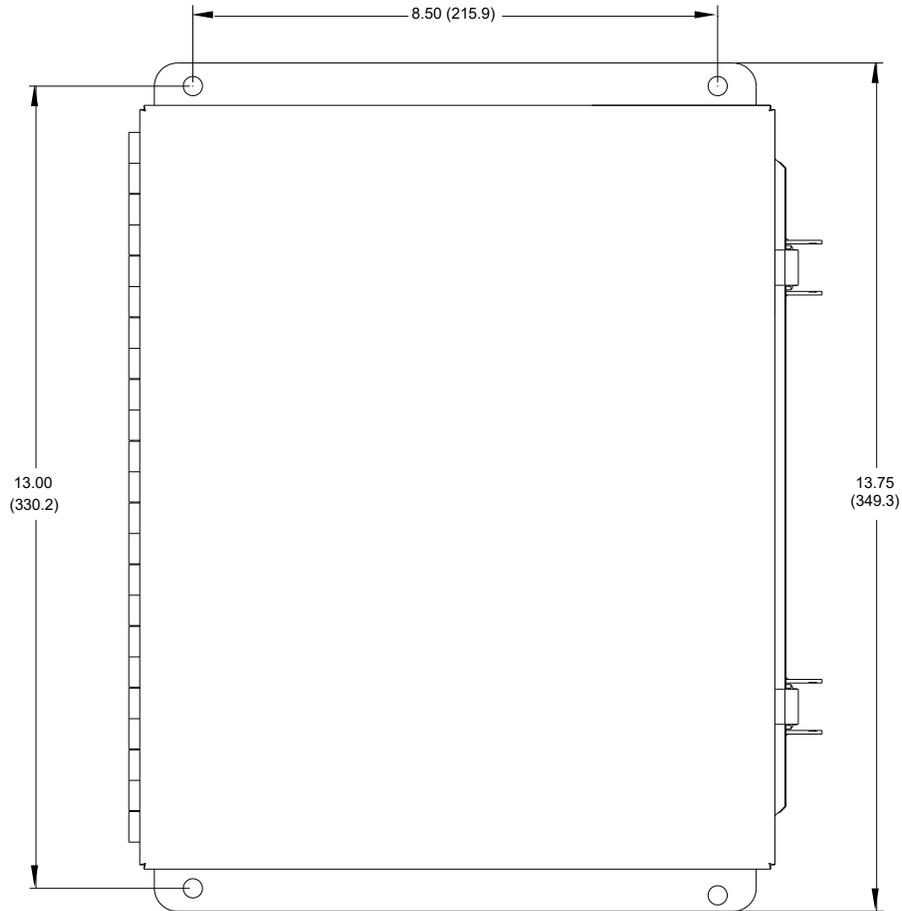
NOTE: All dimensions are in inches (millimeters).

Figure 2.16 – Marker Interface Mounting and Outline (Stainless Steel Option

LIGHTNING ROD
MUST EXTEND 36" (MIN)
ABOVE AND BE LOCATED 18"
HORIZONTALLY AWAY FROM
UPPERMOST FLASHHEAD(S)

FLASHHEAD
FH370d/w

#8 AWG MIN
GROUND WIRE
FROM FLASHHEAD
TO TOWER STEEL

MARKER INTERFACE
ENCLOSURE

MKR 371 LED
L-810 MARKERS

1/2 OVERALL TOWER HEIGHT
(MAY BE INSTALLED HIGHER THAN
NORMAL IF SURROUNDING OBJECTS
WOULD OBSCURE LIGHTS)

#8 AWG MIN
GROUND WIRE FROM
MARKER INTERFACE
ENCLOSURE TO
TOWER STEEL

PHOTODIODE
PHD 516

GPS ANTENNA
(OPTIONAL)

SC 370d/w

TO SITE
POWER

#2 AWG MIN
TO SITE
GROUNDING
SYSTEM

GROUND LEVEL

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

Figure 2.17 – Typical E1/D1 Component Locations

LIGHTNING ROD
MUST EXTEND 36" (MIN)
ABOVE AND BE LOCATED 18"
HORIZONTALLY AWAY FROM
UPPERMOST FLASHHEAD(S)

FLASHHEAD
FH370d/w

#8 AWG MIN
GROUND WIRE
FROM FLASHHEAD
TO TOWER STEEL

MARKER INTERFACE
ENCLOSURE

MKR 371 LED
L-810 MARKERS

3/4 OVERALL
TOWER HEIGHT

#8 AWG MIN
GROUND WIRE FROM
MARKER INTERFACE
ENCLOSURE TO
TOWER STEEL

FLASHHEAD
FH370d/w

FLASHHEAD
FH370d/w

1/2 OVERALL TOWER HEIGHT
(MAY BE INSTALLED HIGHER THAN
NORMAL IF SURROUNDING OBJECTS
WOULD OBSCURE LIGHTS, BUT NOT
LOWER THAN 200')

#8 AWG MIN
GROUND WIRE
FROM FLASHHEAD
TO TOWER STEEL
(TYP OF 2)

MARKER INTERFACE
ENCLOSURE

MKR 371 LED
L-810 MARKERS

1/4 OVERALL
TOWER HEIGHT

#8 AWG MIN
GROUND WIRE FROM
MARKER INTERFACE
ENCLOSURE TO
TOWER STEEL

PHOTODIODE
PHD 516

GPS ANTENNA
(OPTIONAL)

SC 370d/w
TOP

SC 370d/w
MID A

SC 370d/w
MID B

COMM. CABLE

TO SITE
POWER

#2 AWG MIN
TO SITE
GROUNDING
SYSTEM
(TYP OF 3)

GROUND LEVEL

NOTE: Markers and Marker Interface Enclosure are omitted for D2 Installation and for version AC 70/7460-1M filed structures that are over 350 ft. but not more than 700 ft.

Figure 2.18 – Typical E2/D2 Component Locations
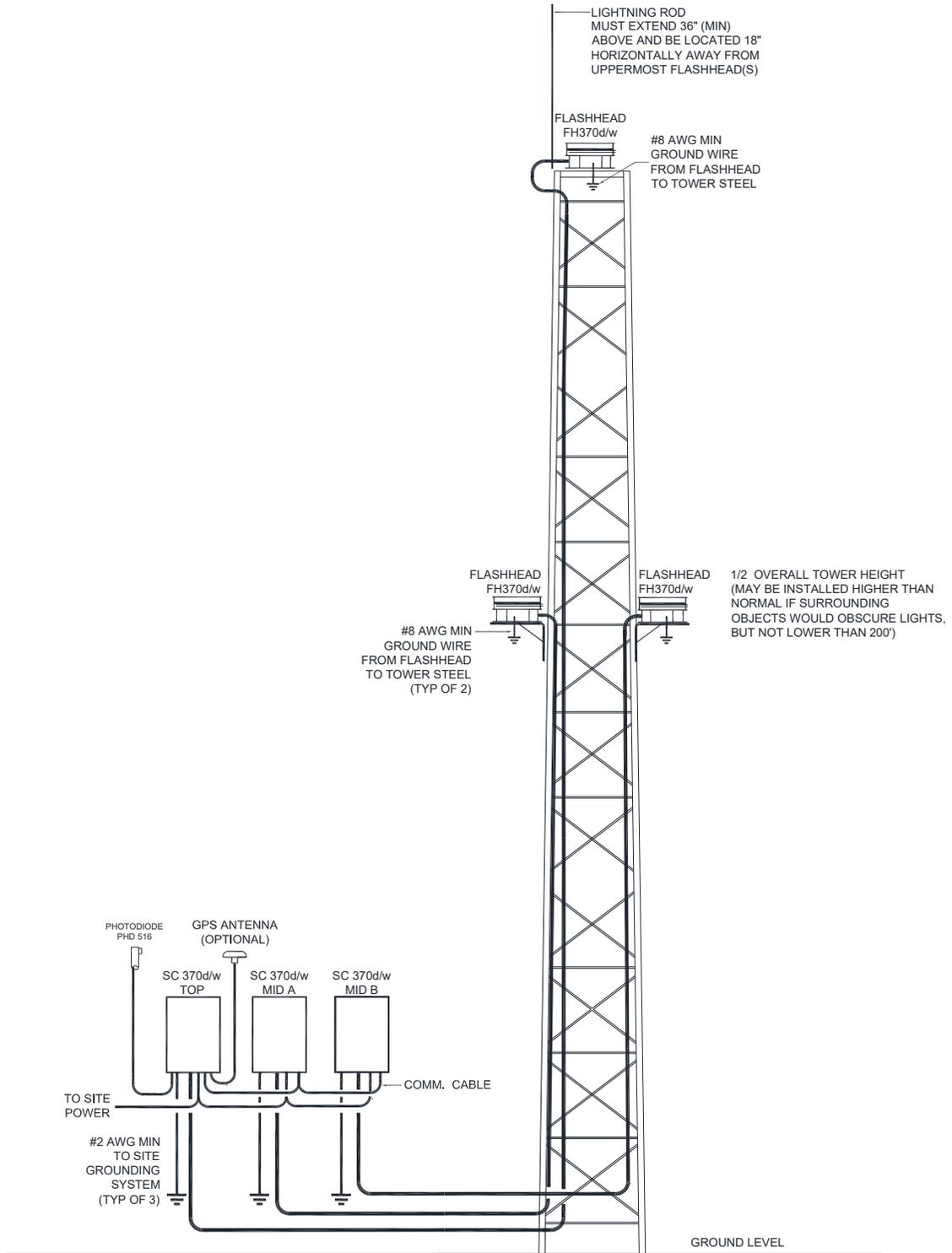
Figure 2.19 – Typical E2/D2 Avian Component Locations (AC 70/7460-1M)
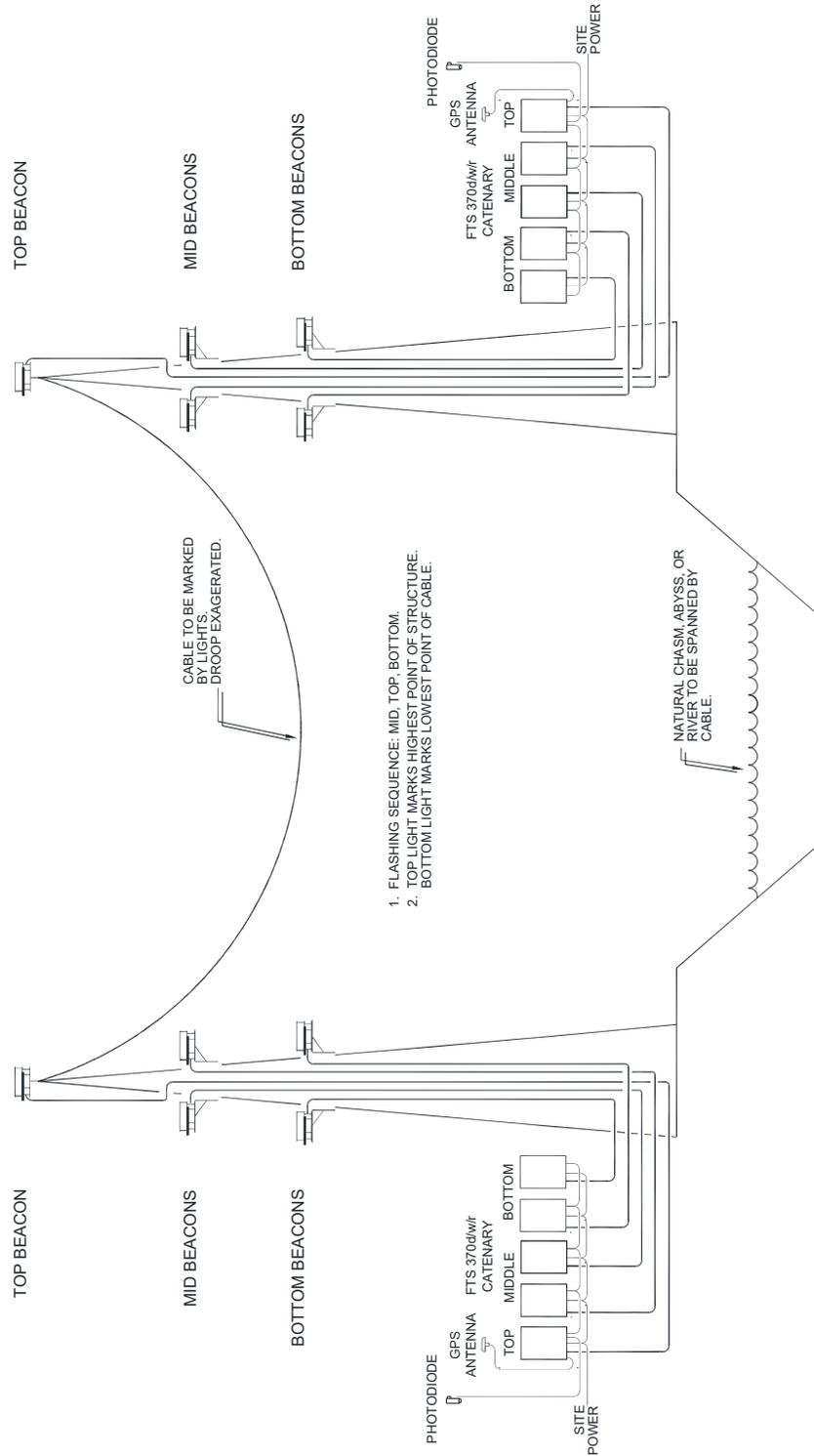
Figure 2.20 – Typical Catenary Component Locations

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 F4210000, F4370000, or F4206000 to connect the flashhead to the SC 370. Splicing of the cable is not permissible on D1 and D2 systems. Place a 5 ft. service loop at the base of the tower near the controller and just below the flashhead. Secure the cable to the structure using the 2/3/4 method. See Securing the Cable: 2-3-4 Tape Method (page 39).

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. Flash Technology recommends 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. In addition, 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: Do not use the Circuit Breaker terminals of TB1 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 (1) or more lightning rods near the uppermost flashhead(s). The copper lightning rod(s) should extend a minimum of 36 inches above the height of the flashhead and a minimum of 18 inches horizontally away from the flashhead.

9. The FH 370(s) must be grounded to tower steel using 8 AWG wire minimum. Flash Technology recommends that all exposed ground connections are coated with a corrosion inhibitor (NO-OX or equivalent).
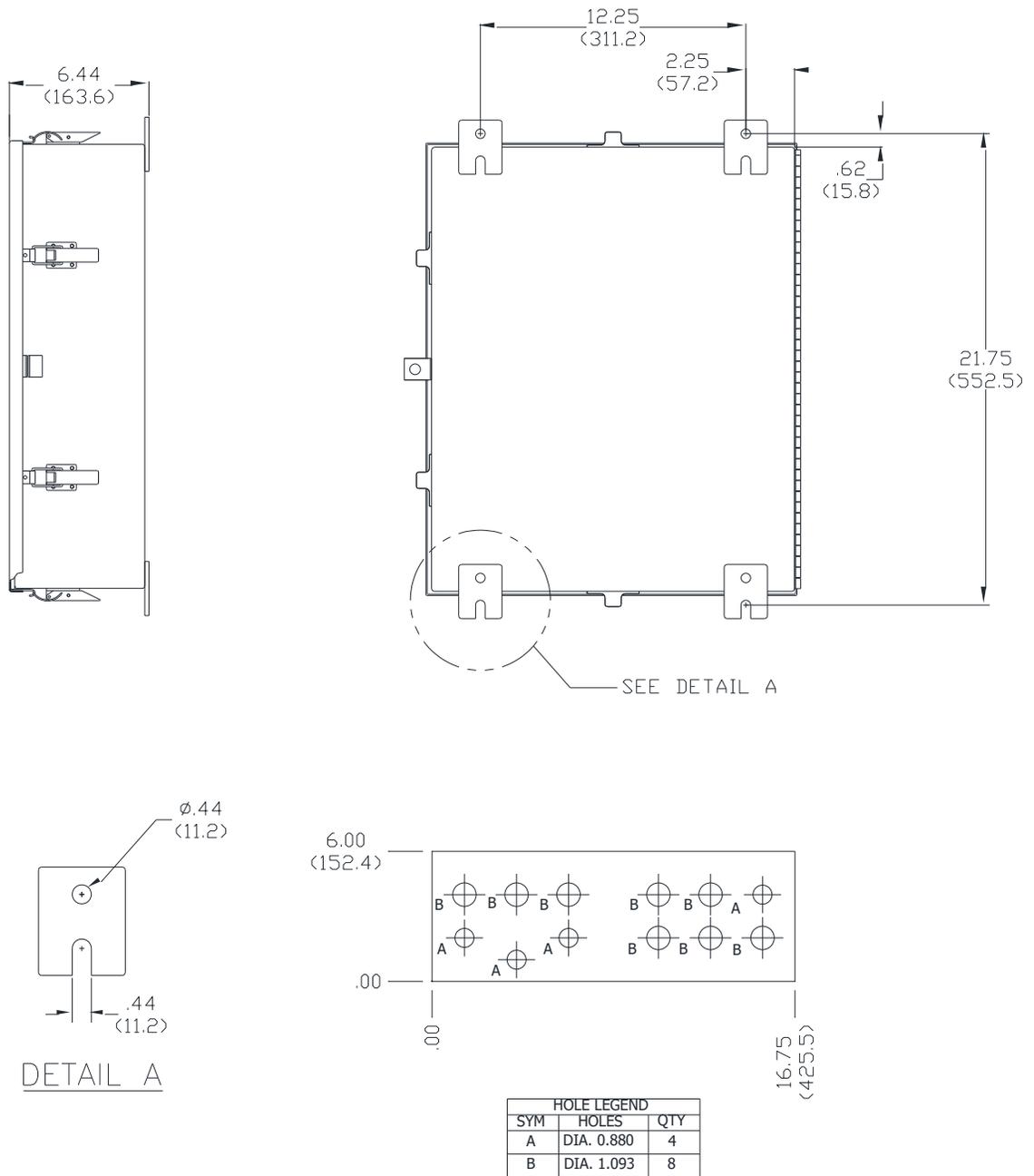
10. Mount the photodiode vertically, outdoors facing an unobstructed polar sky. It must not view direct or reflected artificial light. The photodiode may be mounted at the top end of a vertical length of rigid conduit or to the optional Antenna Mounting Bracket kit (PN F1905355). The photodiode cable may be spliced to provide additional length.

11. Mount the GPS antenna outdoors with an unobstructed view of the sky. Antenna Mounting Bracket Kit (PN F1905355) is recommended for the installation of the GPS antenna.
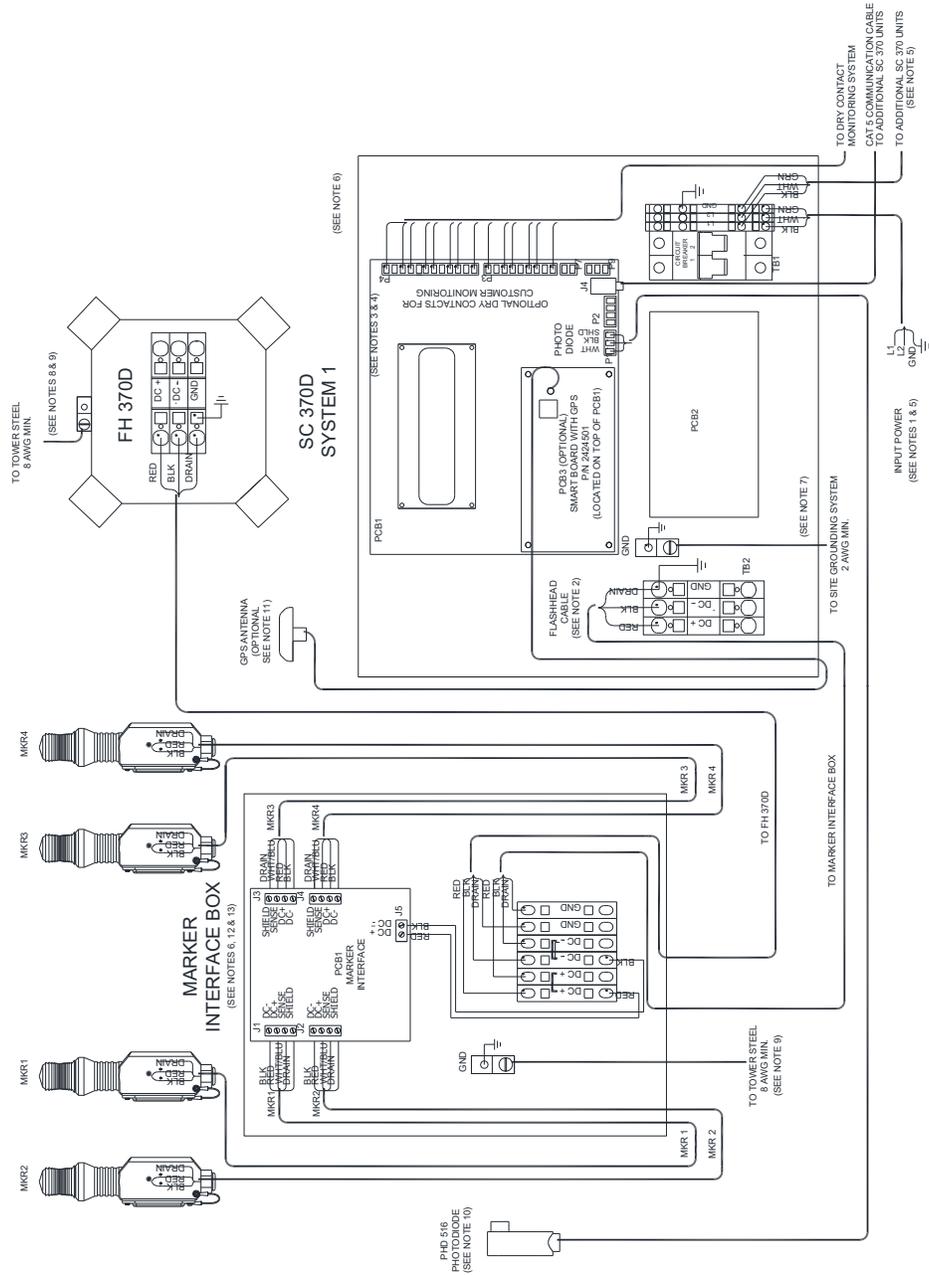
Figure 2.22 – Typical E1 & E2 System Wiring Diagram

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 the number of L-810 marker lights served. Assume 340 VA per SC 370. Also see Note 5.

2. Use only Flash Technology PN F4210000, F4370000, or F4206000 to connect the flashhead to the SC 370. Splicing of the cable is permissible only at the marker interface box (if installed). A 5 ft. 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: 2-3-4 Tape Method (page 39).

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 be 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: Do not use the Circuit Breaker terminals of TB1 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 inches above the height of the flashhead and a minimum of 18 inches 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. Flash Technology recommends coating all exposed ground connections with a corrosion inhibitor (NO-OX or equivalent).

10. Mount the photodiode 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 (PN F1905355). 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 (PN F1905355) 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 (PN F7790107 or F7790108). Refer to "Vanguard® Marker Installation" (PN F7904214) for specific information regarding cable connection to the MKR 371/MKR 372.
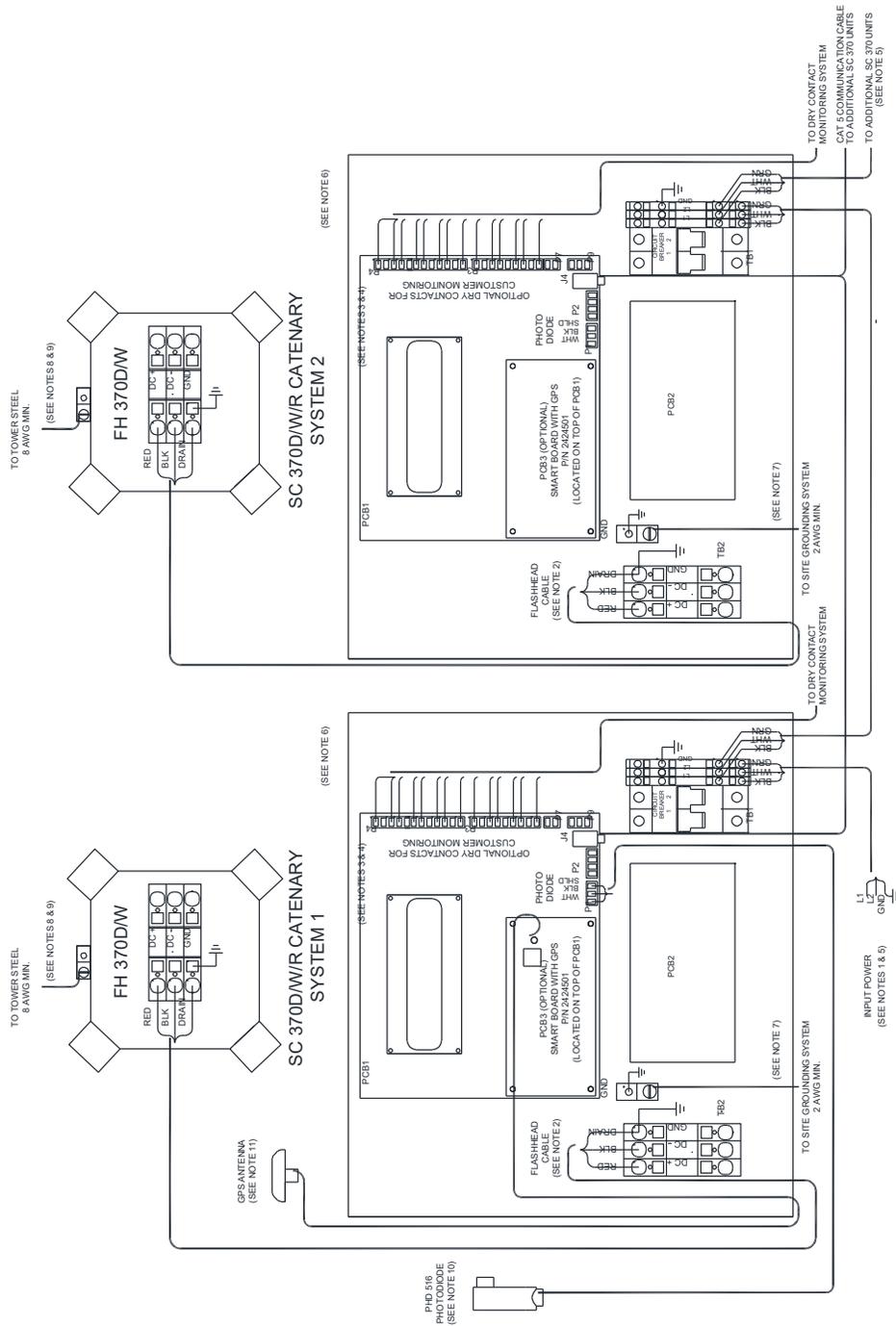
Figure 2.23 – Typical Catenary System Wiring Diagram

SYSTEM WIRING DIAGRAM NOTES (CATENARY)

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

2. Use only Flash Technology PN F4210000, F4370000, or F4206000 to connect the flashhead to the SC 370. Splicing of the cable is not permissible on Catenary systems. A 5 ft. 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: 2-3-4 Tape Method (page 39).

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 be 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: Do not use the Circuit Breaker terminals of TB1 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 (1) or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend to a minimum of 36 inches above the height of the flashhead and a minimum of 18 inches horizontally away from the flashhead.

9. The FH 370(s) must be grounded to tower steel using 8 AWG wire minimum. Flash Technology recommends coating all exposed ground connections 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 (PN F1905355). 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 (PN F1905355) is recommended for installation of the GPS antenna.

Figure 2.24 – SC 370 (AC) Internal Wiring Standard System
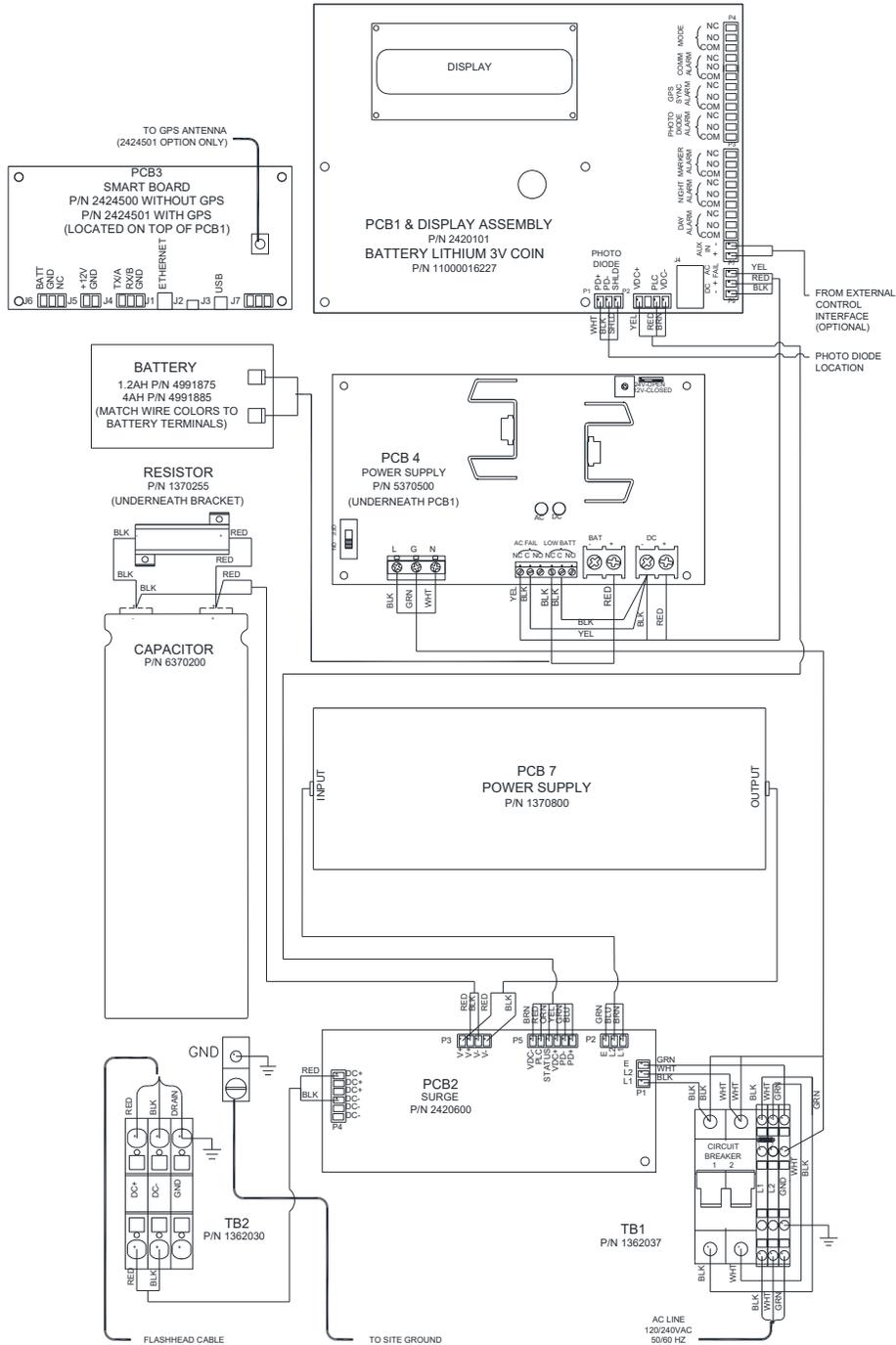
Figure 2.25 – SC 370 (AC) Internal Wiring with Smart Board Option
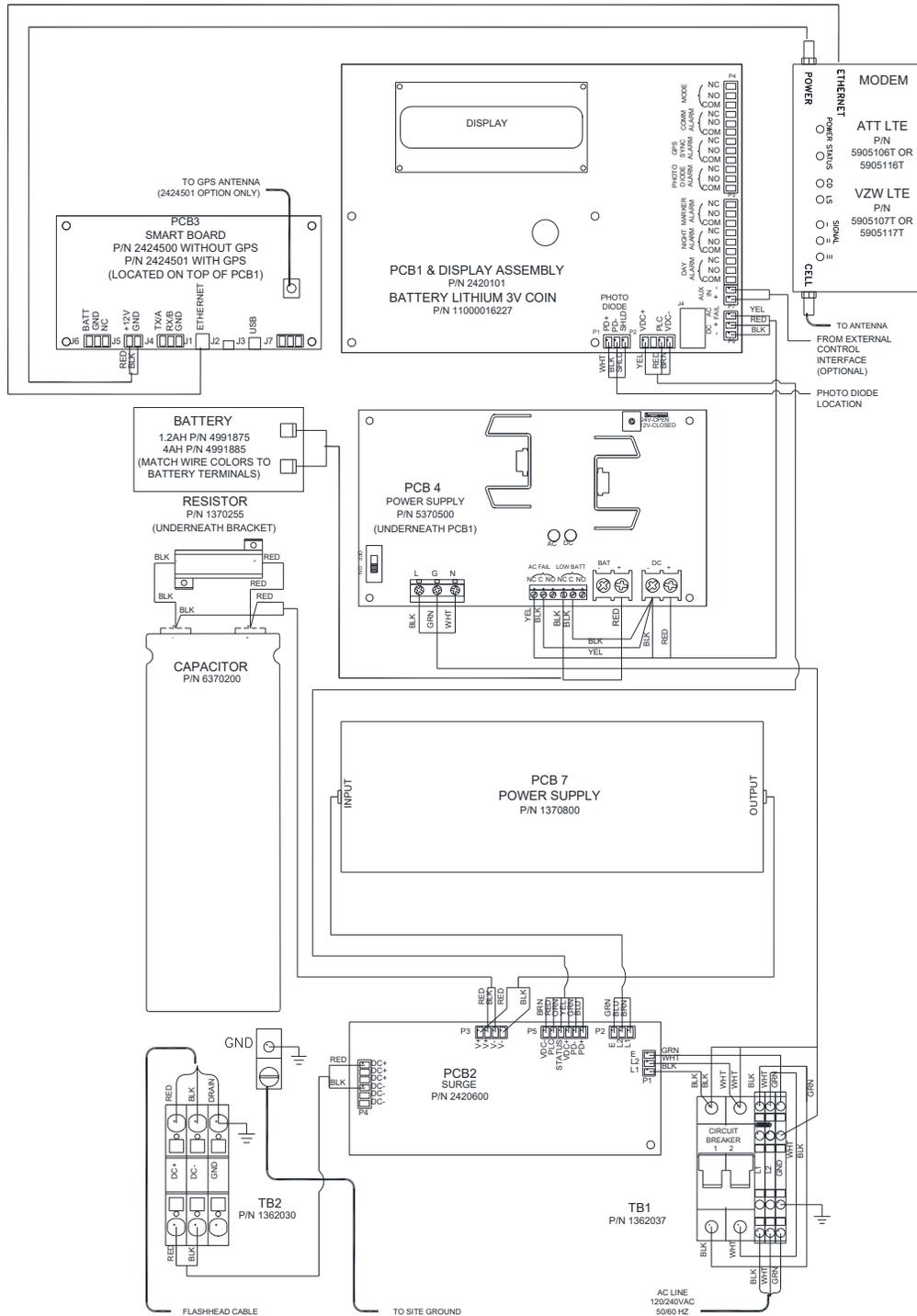
Figure 2.26 – SC 370 (AC) Internal Wiring with Modem Options
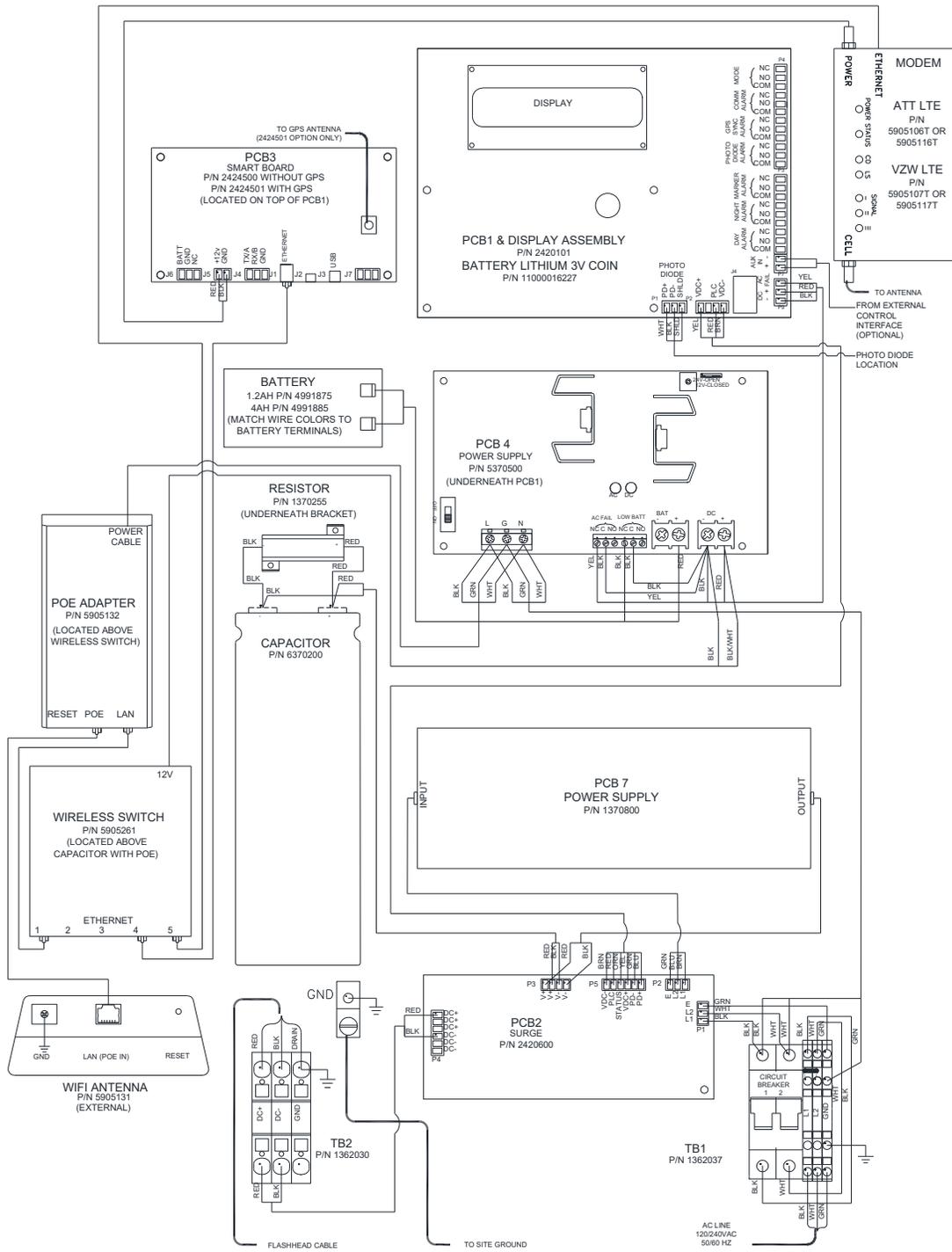
Figure 2.27 – SC 370 (AC) Internal Wiring with Modem & Wi-Fi Options
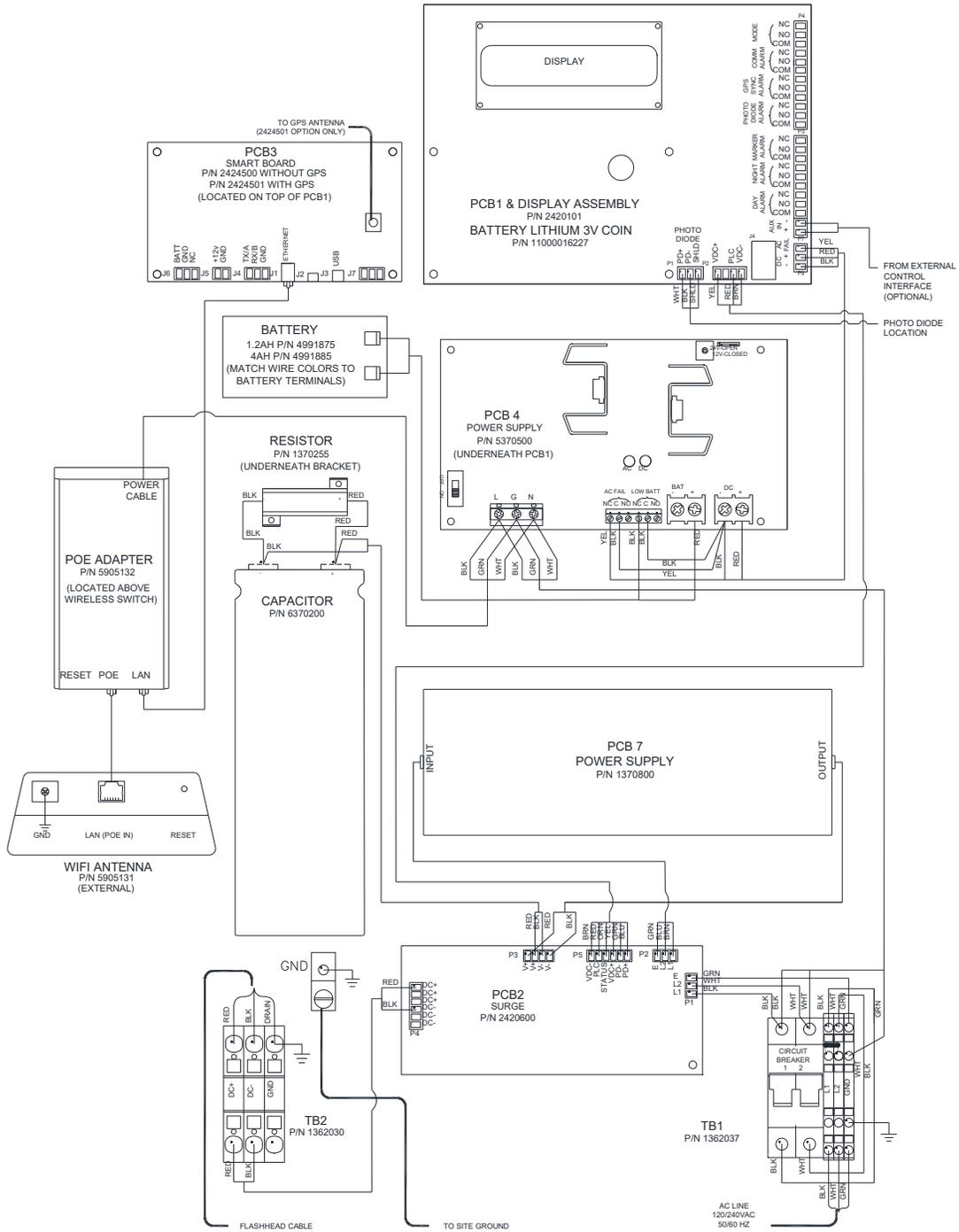
Figure 2.28 – SC 370 (AC) Internal Wiring with Wi-Fi Option
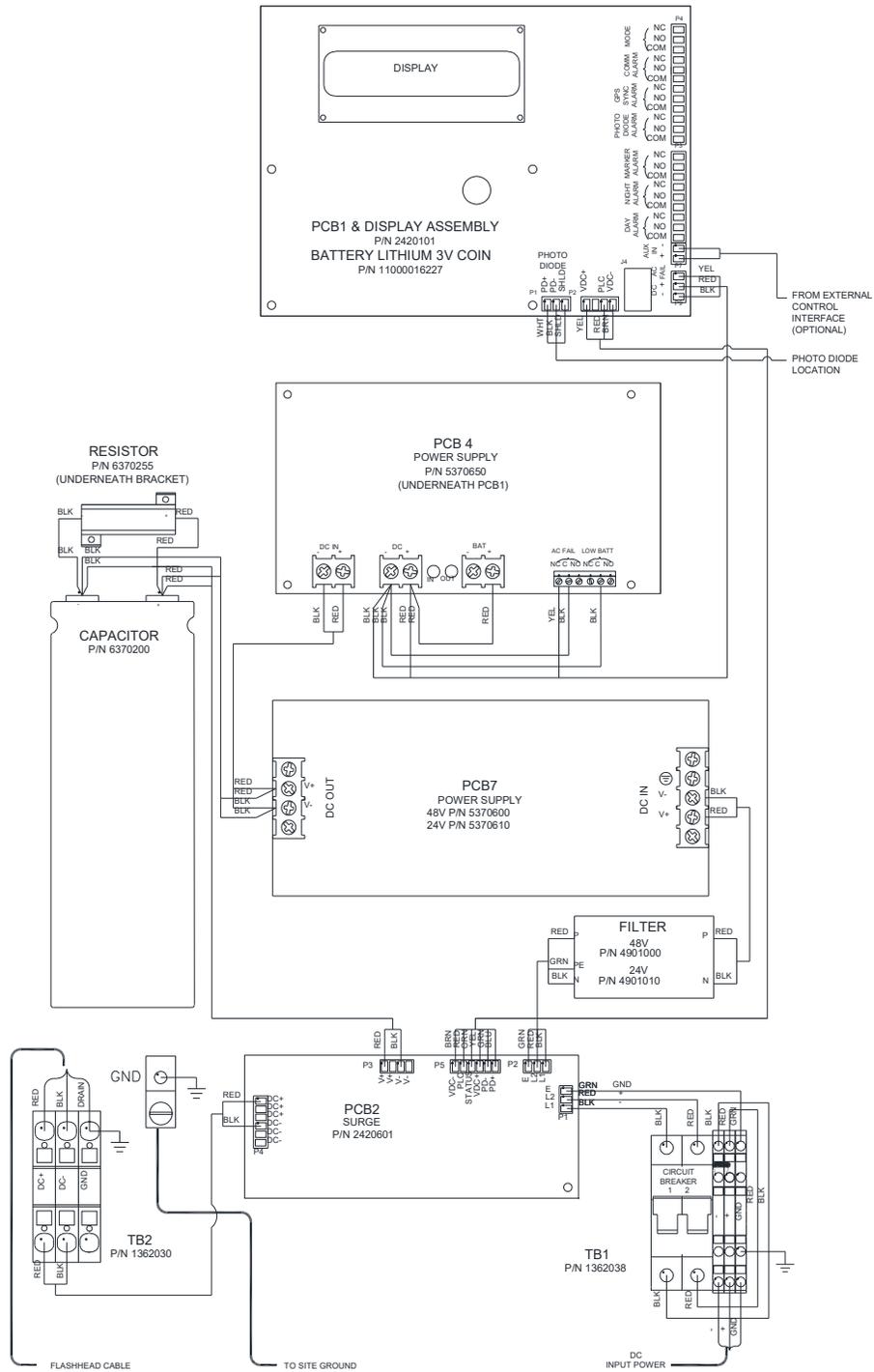
Figure 2.29 – SC 370 (DC) Internal Wiring Standard System
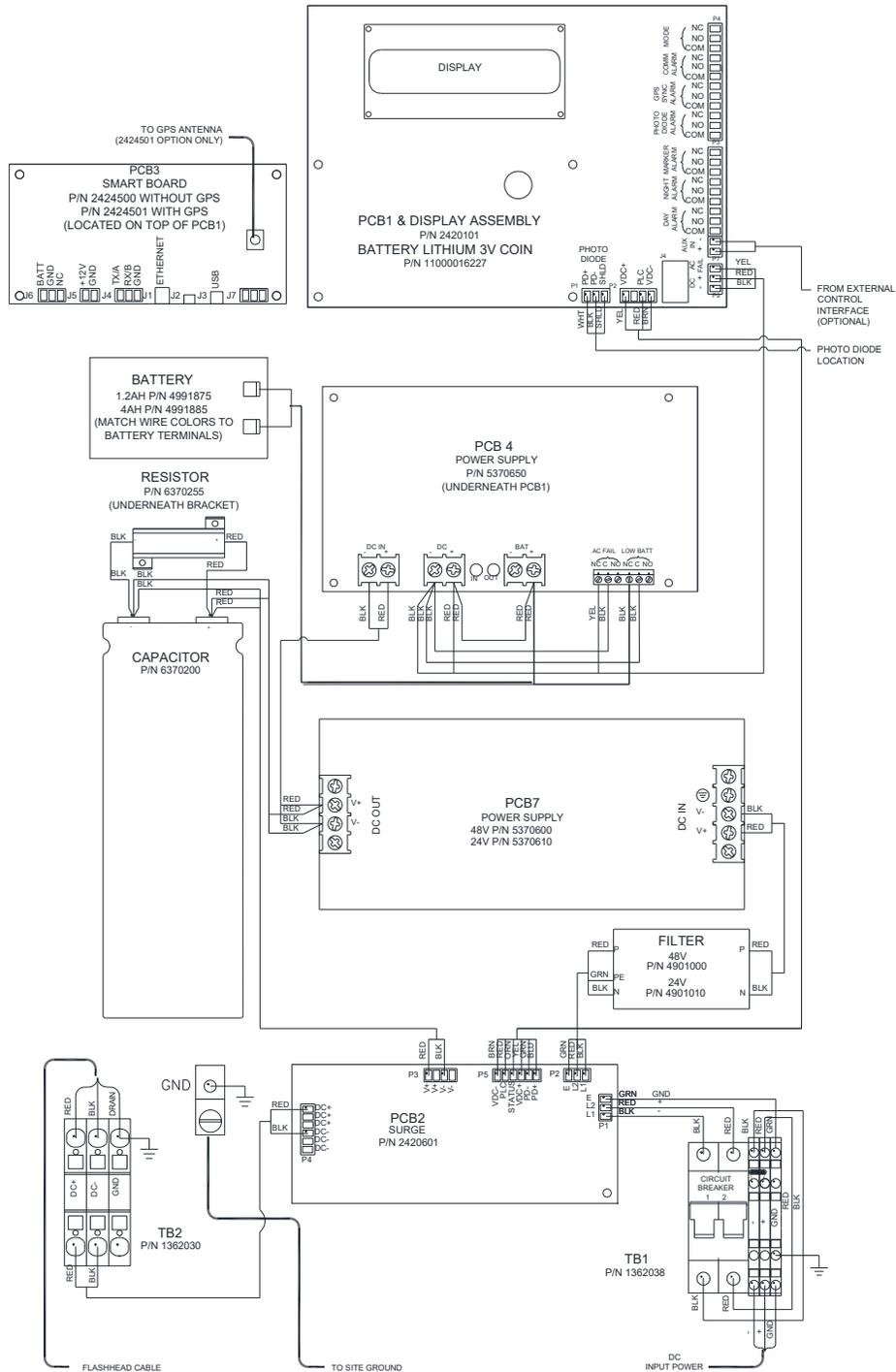
Figure 2.30 – SC 370 (DC) Internal Wiring with Smart Board Option
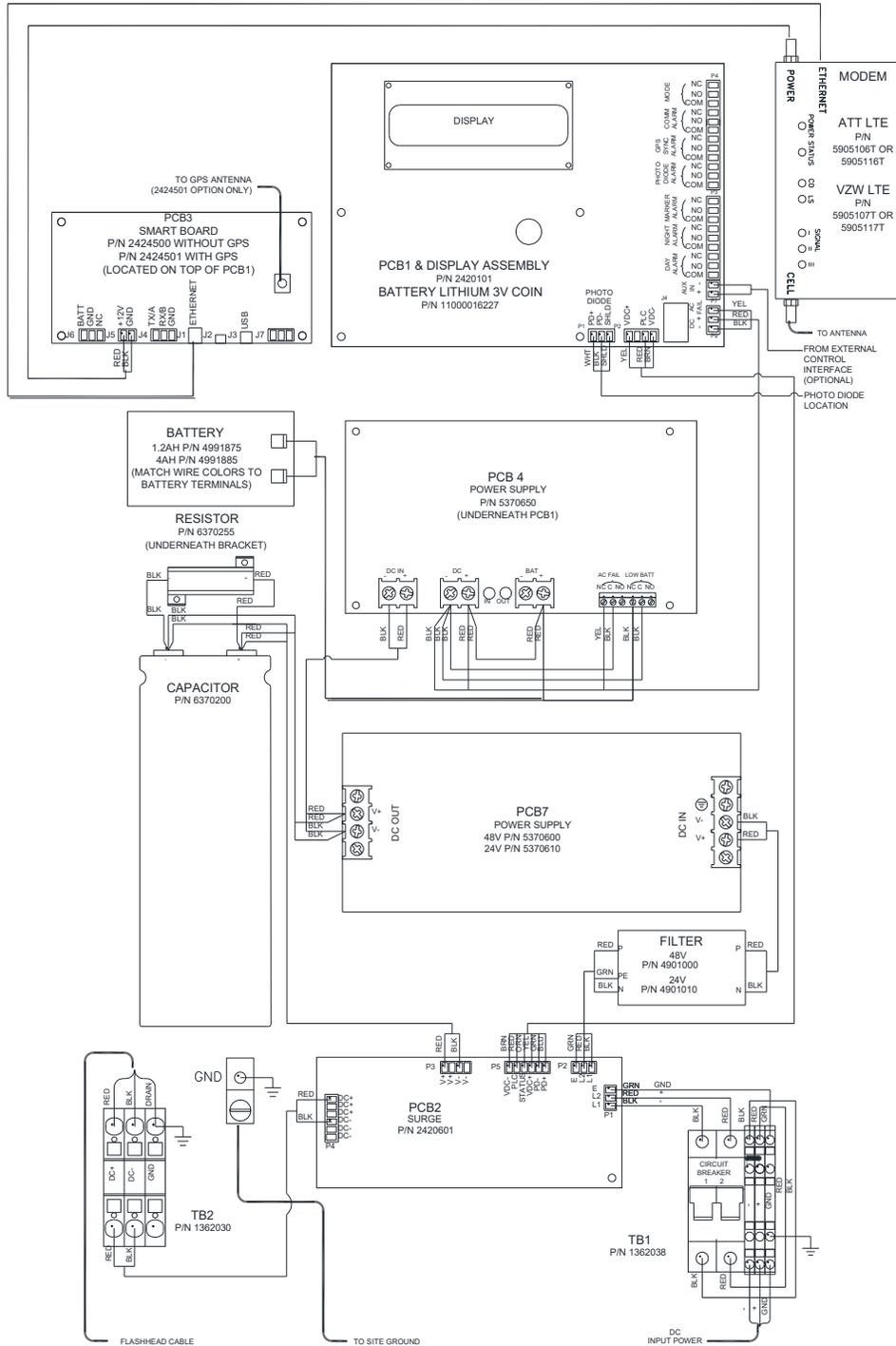
Figure 2.31 – SC 370 (DC) Internal Wiring with Modem Option
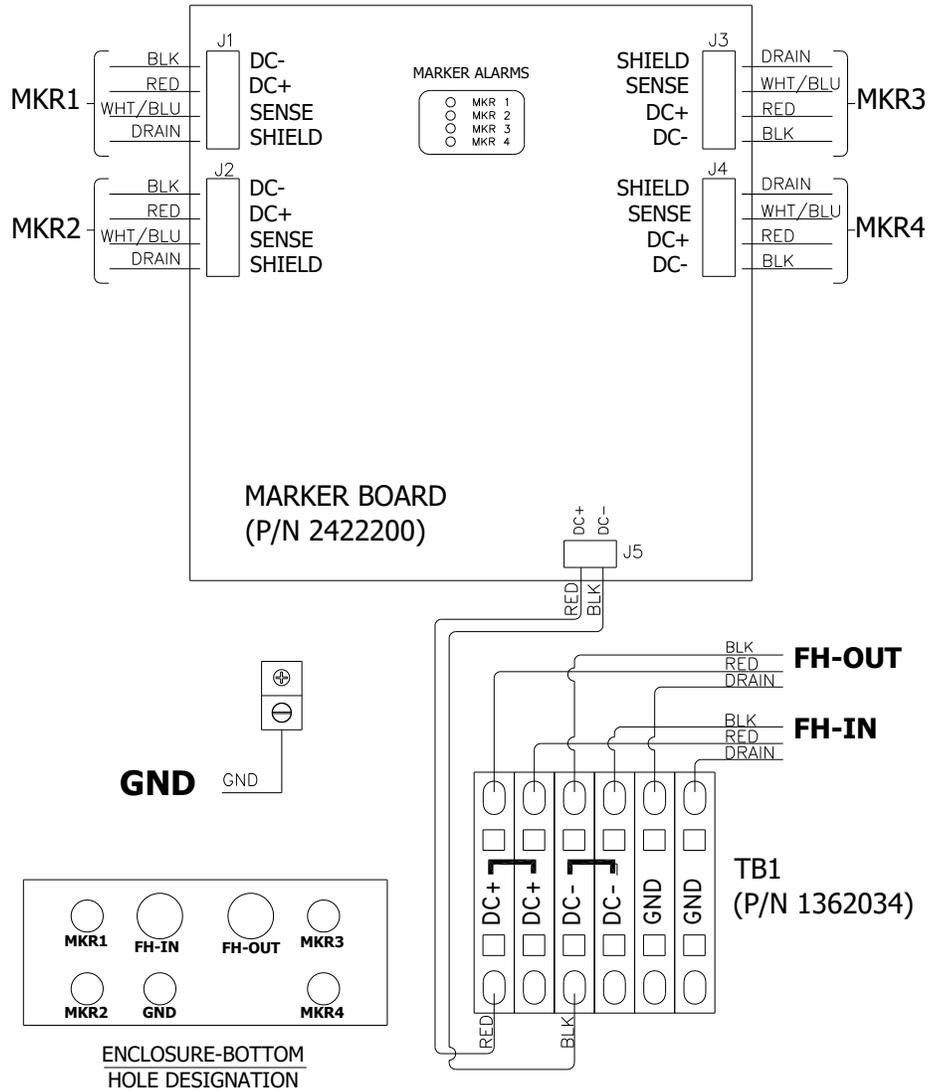
Figure 2.32 – Marker Interface Enclosure Wiring Diagram

3. INFORMATION DISPLAY

NAVIGATING THE INFORMATION DISPLAY

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

Table 3.1 below describes the function of each button. The top level menu is described in Table 3.2 below. Each menu option is discussed in the headings following Table 3.2.
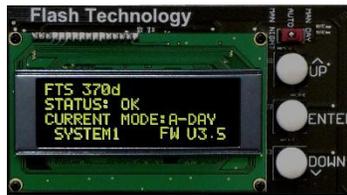
Figure 3.1 – Information Display

Table 3.1 – Controller Display Buttons[2]

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[2]

Menu Option	Description
CONTROL TYPE	Selects the role of the unit as System 1 or Secondary 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.

[2] Menu options and features are based on firmware V3.7 or higher

Menu Option	Description
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 [3] (System 1 only)	This feature allows System 1 to display, and if appropriate, upgrade the firmware version of each connected secondary unit to its current version.[3]

CONTROL 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 secondary units. Each unit must have a unique address. Typically, the uppermost flashhead is connected to the unit programmed as System 1. **The photodiode is always connected to the unit designated as SYSTEM1**.
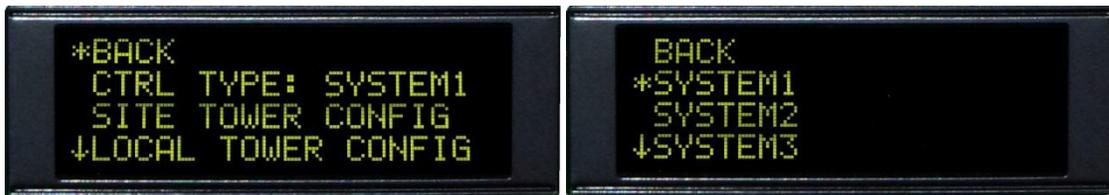
- Press the ENTER button to activate the programming menu.
- Press the down arrow to move the * to CTRL TYPE and press the ENTER button to display the System Number menu.
- Use the DOWN button to move the * to the desired system number (1 – 6) and press ENTER to select.
- The system will return to the 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 topics

SITE TOWER CONFIGURATION

The Site Tower Configuration menu is only available on the unit programmed as System 1. This menu enables programming of the lighting type, total number 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 or flashing. If the flashing option is selected, the markers will flash in synchronization with the beacon(s).

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[3] Secondary units must have firmware V3.0 or higher installed to receive firmware upgrade from System 1.

RED FLASH MODE

Red Flash Mode provides two options: Efficiency and Legacy. Efficiency mode has a shorter flash duration and consumes less energy. Legacy produces a longer flash duration that resembles the output of an incandescent lighting system. Both modes have an output of 2,000 E as required by the FAA. Efficiency is recommended for all system installations. Legacy is recommended only if the lighting system must synchronize with Flash Technology incandescent lighting systems on nearby towers.

GPS SYNC

GPS Sync allows the FTS 370 system to wirelessly synchronize with other lighting systems regardless of their distance from the primary system. 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 (3) SC 370 power and control units and associated flashheads are required for catenary operation. Catenary position programming is located in the Local Tower Configuration (page 76) menu. At least one (1) unit must be programmed for each of the following positions: top, middle and bottom.

NOTE: The catenary flash sequence as specified by the FAA is: middle - top - bottom.

DRY CONTACTS

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

Selecting "Combined" allows dry contact information from secondary 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 "Separate" 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 for monitoring.

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 exceed the 19-hour mode timer (for example, locations inside the Arctic Circle). 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 P2 Auxiliary Input (page 24) and shown in Figure 2.24 to Figure 2.31 (beginning on page 62). A description of each Auxiliary Input menu option is explained in the following bullet points:

- **Help** describes 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" (PN F7904502), 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** is 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 FH 370d/w/r in Section 1 for additional information regarding IR.

MARKERS ENABLED

This option allows the system to disable markers without generating configuration alarms. The markers are turned off on all the systems. In addition, the value of "markers per tier" will be set to zero for 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.

FLASH SPECIFICATION

This option shows the lighting specification that the system is compliant with. Choices include FAA, ICAO, 4K White Night, and CAR621. The bound flashhead needs to match the chosen specification.

NOTE: Selecting a flash specification that doesn't match the capabilities of the flashhead bound to the system will generate a configuration alarm.

			Red	
Site Tower Configuration (System 1 only)	Tower Type		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	
	Flash Specification		FAA	
			ICAO	
			4K White Night (4000 effective candela white night output)	
			CAR621	
	Skip White Night LI		Yes/No	
	Power Supply PCB Mode[9]		Smart/Standard	

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.
9. Only effective when used with PCB4 Smart Power Supply (F2428000); otherwise, retain the default 'Standard' setting.

LOCAL TOWER CONFIGURATION

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 (2) 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 5VDC 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, (System1, System4).

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			
	Man Ovr Switch	Enable / Disable			
	Marker Sense Switch	Legacy / 3rd Wire			

1. All uppermost beacons in a dual system must be programmed as "AOL Beacon", (System 1, System 4).
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 CONFIGURATION

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.

- 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" (PN 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" (PN 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	XXXXXXXXXXX	
		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)	
	ATT SIM: (SIM Card Type)	

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 and 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
		Modem PWR Relay	On/Off
		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.

- 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
		IR 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. For hardware with a real time clock, setting the date and time are available here.

NOTE: Firmware Version 3.4 or higher required. Firmware Version 3.6 or higher AND RTC capable hardware required for clock settings.

System Settings	System Reboot	Yes /No
		Yes Confirm?
	Reset Factory Default	Yes /No
		Yes Confirm?
	Customized Configuration[1]	Waiting for password
		*****
	Real Time Clock	Date
		Time
		Daylight Savings Time (Enable/Disable)
	Configuration Change Trap[2]	Yes/No

1. Requires a valid password to set the customized configuration. Upon success unit will set the customized configuration based on the password entered.
2. When set to 'Yes', a trap is generated for each detected configuration change.

FACTORY DIAGNOSTICS

This menu displays diagnostic information about the communications quality from the controller to the lights on the tower.

NOTE: Firmware Version 3.6 or higher required

| Factory Diagnostics | BCN 1 PLC | 99% 99% |
| | MKR 1 PLC | 98% 98% |

SYSTEM X FIRMWARE

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

NOTE: Secondary 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 secondary 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 primary and secondary unit(s) during the upgrade. The upgraded secondary 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, page 24). 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: Secondary 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 LEDs located on PCB 1.

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 secondary unit

Alarm	Definition
	(System 2-6). A communication failure on any secondary 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.
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 secondary 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 (58 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 secondary 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
STATUS: FLSH SPEC ALM	The chosen flash specification is not supported by the bound flashhead.

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.
5.

FLASH TECHNOLOGY

Product Manual

Site Name: Not Set

Site ID: Not Set

For Support: 1-800-821-5825

Note: Click on the Tower device component to launch the status/diagnostic details.

Note: Tower details and flash rate are not to scale.
Marker tier may not represent the actual marker tier location. It is assumed that Marker Tier 1 is always on the bottom tier.
Beacon position may not represent the actual location of the beacon for E1+ towers
Tower flashing does not work in Internet Explorer 11 and earlier versions.

Legend

Color Code	Description
■	Tower Lighting Alarm
■	Communication Alarm
■	Marker Alarm

Tower Lighting Status

Description	Value
Controller	FTS 370d AVN
Tower Lighting Type	Dual
Total Beacons	3
Beacon IR Capable	1: Yes, 2: Yes, 3: Yes,
Tower Lighting Operating Mode	Day
Photodiode Mode	Day
Cellular IP Address	
Signal Strength (Bars)	5
Total Alarms	● 0

Lighting Inspection

Lighting Inspection Type: Inactive

Lighting Inspection Stage: No Record

Auto Fast LI	1 Button inspection. BCNs/MKRs tested in parallel with no user interaction
Manual Fast LI	BCNs/MKRs tested in parallel but holds restore stages for user input
Manual Staged LI	BCNs/MKRs tested in each mode singly & sequentially holds restore stages for user input
Manual LI	BCNs/MKRs tested one at a time based on user selection. Maximum timeout for each test is 30 minutes
Results Page	View the Lighting Inspection progress and results page

Force Mode Override

Description	State
Current Override Mode	● Auto

Select the 30 minute override mode:

White Day	White Night
Red Night	Cancel

Event History

Event Log

Diagnostics

Diagnostics

Download Log File

Download Log File

Configuration

Configuration

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TOWER LIGHTING STATUS

A Lighting Status graphic provides an overview of the lights on the tower and the status of each light. When in alarm, the light will not flash and follow one of the legends as mentioned in the legend table below. SC will show green if not in alarm and will turn Red when in alarm.
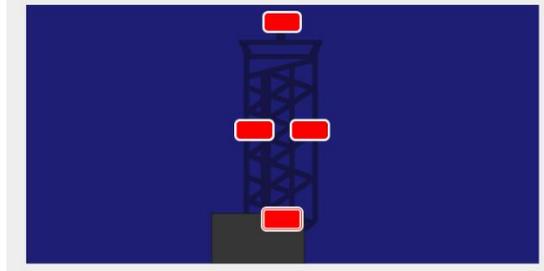
The legend table below the graphic describes the color code and what each color means.

Legend

Color Code	Description
	Tower Lighting Alarm
	Communication Alarm
	Marker Alarm

Tower Lighting Status

Description	Value
Controller	FTS 370d IR
Tower Lighting Type	Dual
Total Beacons	3
Total Marker Tiers	0
Tower Lighting Operating Mode	Red Night
Photodiode Mode	Day
Cellular IP Address	
Signal Strength (Bars)	4

The Tower Lighting Status is summarized in the table below the legend.

DIAGNOSTICS

The diagnostics for beacon performance are obtained by clicking on the selected light in the graphic. The diagnostics for beacon include tables and bar graphs showing A2D values. Operational status is indicated via color (Green for OK, Red for Alarm).

Menu

Home

* A2D values listed on this page are unit-less and are not actual ampere or voltage values.

Beacon 1 V1.5

Description	State
Beacon Communication Alarm (BCN COMM)	🟢 OK
Red Night Alarm (RNIGHT ALARM)	🟢 OK
White Day Alarm (DAY ALARM)	🟢 OK
White Night Alarm (WNIGHT ALARM)	🟢 OK
Infrared Alarm (IR ALARM)	🟢 OK
AOL Beacon	Yes
Life Runtime (days)	94
Reboot Counter	34
Beacon Core Temperature	35.8 °C / 96.4 °F
Firmware Revision	IR BCN: NOV 22 2019 08:59:21

Beacon 1 A2D V1.5

Description	Voltage	Current
WHT1	2123	2651
WHT2	2416	2649
WHT3	2070	2650
WHT4	2071	2646
WHT5	2421	2655
RED0	2241	1749
RED1	2231	1751
IR	0972	2383
Tower DC Voltage	3275	
PLC Communications Quality	97%	

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Markers, if present, will also have their own Diagnostics with bar graphs and A2D values shown.

If a marker is not connected, for instance, the 4th marker position in a 3-marker tier, it will indicate a "Fault" and a caution color (yellow).

Menu

Home

* A2D values listed on this page are unit-less and are not actual ampere or voltage values.

Marker Tier 1 V3.2

Description	State
Marker Tier Communication Alarm (MKR COMM)	● OK
Marker Alarm (MKR ALARM)	● OK
Life Runtime (days)	853
Reboot Counter	19
Markers in Tier	3
Marker Output 1	● OK
Marker Output 2	● OK
Marker Output 3	● OK
Marker Box Temperature	27.3 °C / 81.2 °F
Firmware Revision	SB MKR: FEB 4 2021 10:07:48

Marker Tier 1 A2D V3.2

Description	Value
Markers Per Tier	3
MKR1 Current	3095
MKR2 Current	3062
MKR3 Current	3024
MKR4 Current	0000
Marker Drive Voltage	3060
PLC Communications Quality	99%
Marker Sense Switch State	3rd Wire
Marker Sense Switch Override State	Auto
25% out detection state	0x08
MKRS Sensed	3
MKR1 3rd Wire Sense	1562
MKR2 3rd Wire Sense	1563
MKR3 3rd Wire Sense	1567
MKR4 3rd Wire Sense	0003
MKR1 PTC State	Normal
MKR2 PTC State	Normal
MKR3 PTC State	Normal
MKR4 PTC State	Normal
MKR1 25% Out State	Normal
MKR2 25% Out State	Normal
MKR3 25% Out State	Normal
MKR4 25% Out State	Recovery

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SYSTEM CONTROLLER

System Controller information is accessed by clicking on the System Controller in the tower graphic. Status information of each system controller can be viewed separately. Operational Status and Alarms are indicated by color code.

The System Controller menu includes operational status of the modem in its own table when the monitoring method is set to Cellular Eagle.

Site Name: Not Set

Site ID: Not Set

For Support: 1-800-821-5825

Menu

Home

* A2D values listed on this page are unit-less and are not actual ampere or voltage values.

Controller 1 V3.7

Description	State
System Communication Alarm (SYS COMM)	OK
Lighting Inspection Test Mode (LI TEST MODE)	Off
Site Mode Override	On
Photodiode Alarm (PD ALARM)	OK
System GPS Sync Alarm (GPS ALARM)	OK
Tower Lighting Configuration Alarm (CFG ALARM)	OK
System Power Failure Alarm (POWER FAIL)	OK
Low Tower Lighting DC Voltage Alarm (LOW DC)	OK
Tower Lighting Sync Alarm (TWR SYNC)	OK
PLC Bindings Alarm (BIND ALARM)	OK
Tower Lighting Operating Mode	Red Night
Photodiode Mode	Day
Photodiode A2D Value	4094
Infrared Not Available Alarm (IR N/A)	OK
Life Runtime (days)	64
Reboot Counter	33
Controller Box Temperature	35.2 °C / 95.3 °F
Tower DC Voltage	61.6 V
Bind State	Beacon
Firmware Revision	SB CTRL: MAR 18 2020 10:46:56

Controller 2 V3.7

Description	State
System Communication Alarm (SYS COMM)	OK
Lighting Inspection Test Mode (LI TEST MODE)	Off
Mode Override	Off
Tower Lighting Configuration Alarm (CFG ALARM)	OK
System Power Failure Alarm (POWER FAIL)	OK
Low Tower Lighting DC Voltage Alarm (LOW DC)	OK
Infrared Not Available Alarm (IR N/A)	OK
Life Runtime (days)	155
Reboot Counter	237
Controller Box Temperature	31.3 °C / 88.3 °F
Tower DC Voltage	59.7 V
Bind State	Beacon
Firmware Revision	SB CTRL: MAR 18 2020 10:46:56

Controller 3 V3.7

| Description	State
System Communication Alarm (SYS COMM)	OK
Lighting Inspection Test Mode (LI TEST MODE)	Off
Mode Override	Off
Tower Lighting Configuration Alarm (CFG ALARM)	OK
System Power Failure Alarm (POWER FAIL)	OK
Low Tower Lighting DC Voltage Alarm (LOW DC)	OK
Life Runtime (days)	72
Reboot Counter	126
Controller Box Temperature	30.8 °C / 87.4 °F
Tower DC Voltage	59.7 V
Bind State	Beacon
Firmware Revision	SB CTRL: MAR 18 2020 10:46:56

Modem Status

| Description	State
Cellular IP Address	
Modem Type	LTE
Signal Strength (Bars)	4
Signal Strength (Decibels)	78 dB
Cellular Service Type	LTE
IMEI Number	
SIM Card Type	AT&T ROW2
Roaming Status	Not Roaming
Cell Number	

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AUXILIARY INPUT

If enabled, "Auxiliary Input" section is shown at the top of the System Controller Menu. This menu is informational only and displays the configuration and current status of the interface.
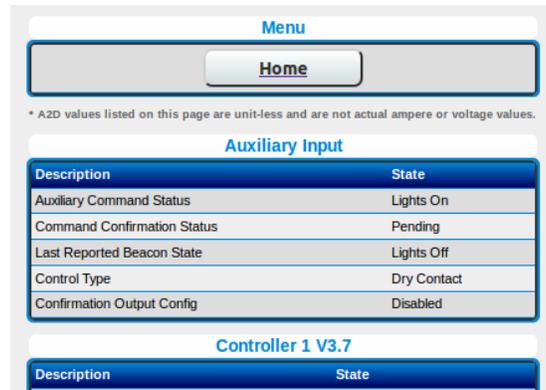
LIGHTING INSPECTION (LI)

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.
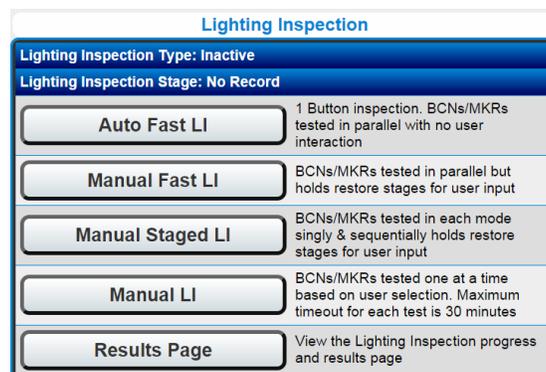

AUTO FAST LI

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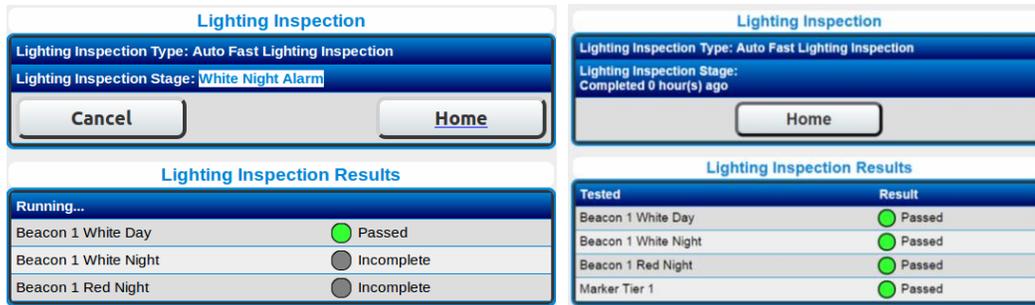
MANUAL FAST LI

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 test is completed.
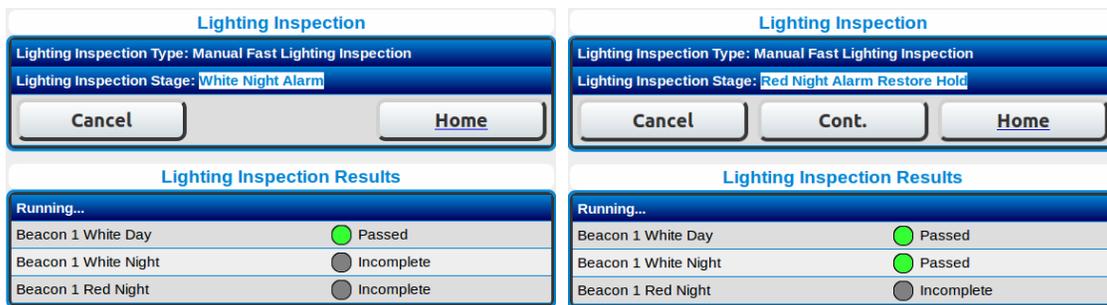

MANUAL STAGED LI

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 test is completed.
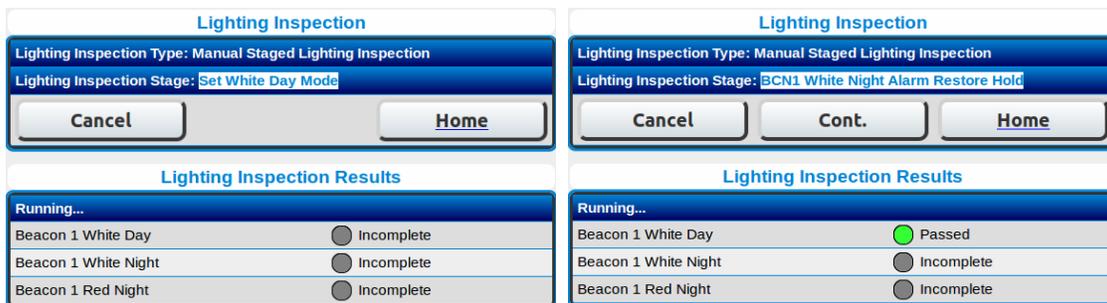
MANUAL LI

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.
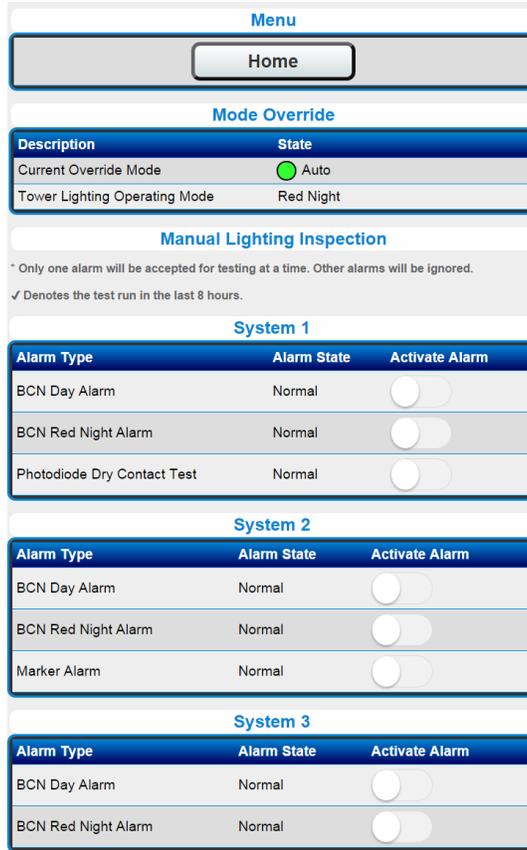
MODE OVERRIDE

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".

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.

<table>
<tr><td colspan="2" align="center">**Lighting Inspection**</td></tr>
<tr><td colspan="2">Lighting Inspection Type: Inactive</td></tr>
<tr><td colspan="2">Lighting Inspection Stage: No Record</td></tr>
<tr><td>**Results Page**</td><td>**Home**</td></tr>
</table>

* Event age beyond the latest reboot event is for indicative purpose only. It does not reflect how long the unit was off.

Click here for the Description of Reboot Event Codes

Event Log: 378 (Events)	
Event	**Age (Time Since Last Event)**
REBOOT EVENT (U)	0D 0H 17M
PD ALARM -> RST	0D 0H 17M
PD ALARM -> ALM	0D 1H 20M
REBOOT EVENT (Z)	0D 20H 20M
SYS1 LI TEST -> OFF	0D 21H 13M
PD ALARM -> RST	0D 21H 14M
SYS1 MODE OVR -> OFF	0D 21H 15M
PD ALARM -> ALM	0D 21H 15M
BCN1 RNIGHT -> RST	0D 21H 15M
BCN1 RNIGHT -> ALM	0D 21H 17M
BCN1 WNIGHT -> RST	0D 21H 17M
BCN1 WNIGHT -> ALM	0D 21H 20M
BCN1 DAY -> RST	0D 21H 21M
BCN1 DAY -> ALM	0D 21H 23M
SYS1 MODE OVR -> ON	0D 21H 24M
SYS1 LI TEST -> ON	0D 21H 24M

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.

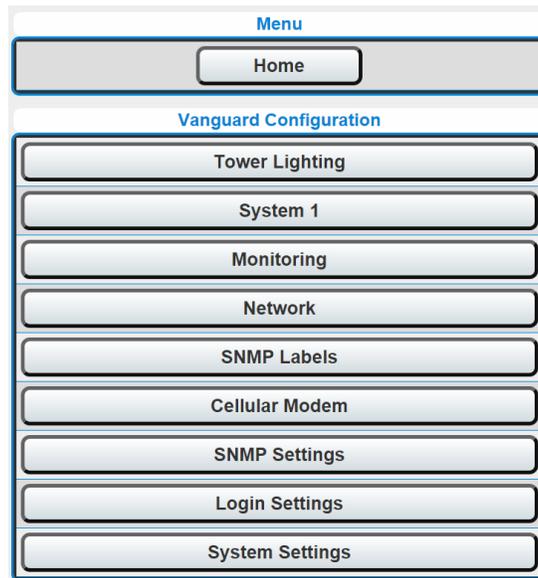| Reboot Event Codes	
Code	**Description**
A	The configured number of slave units are not communicating
B	The master unit has requested a non-responsive slave to reboot
C	Cellular communication has been lost to the Flash Technology NOC.
D	A reboot was initiated from the display user interface.
N	The firmware has repaired a memory error in the system hardware.
R	A reboot was requested from the Flash Technology NOC or over Modbus.
S	A slave unit (system2-6) has completed a firmware upgrade.
T	The firmware has detected a portion of its code is non-responsive.
U	A master unit (system 1) has completed a firmware upgrade.
W	A reboot was initiated from the web (Wi-Fi) interface.
Z	An unknown event has caused the unit to reboot.
P	No Communication from CPU to PLC Chip.
W	A reboot was initiated from the SNMP interface.

DOWNLOAD LOG FILE

The Download Log File page allows the user to download the log file from the unit for analysis by Tech Support. Click on Download button to download the log file.

Vanguard Log file

Log file is created.
Click on download button to download the file.

Menu

Home	Download!
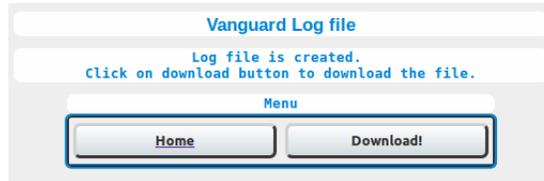
CONFIGURATION

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. The configuration menu is shown below.

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

Menu

Home

Vanguard Configuration

- Tower Lighting
- System 1
- Monitoring
- Network
- SNMP Labels
- Cellular Modem
- SNMP Settings
- Login Settings
- System Settings

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

TOWER LIGHTING CONFIGURATION

The Tower Lighting menu provides all programming options discussed in . It also adds the option to input the site name and site ID.

Options for configuration of Auxiliary Input Control Type and Confirmation Output are 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 Local Tower Configuration (page 76) 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 alarms prior to issuing all required notifications.

Menu

Back	Home

System 1 Configuration

Description	Current State	Set State
Markers Per Tier	3	--- Select ---
AOL Beacon	Yes	(on)
Beacon Bind State	Bound	
Marker Bind State	Bound	
Beacon Enabled	Yes	(on)
Marker Sense Switch Override	Auto (3rd Wire)	○ 3rd Wire ○ Legacy

System 1 Reportable Events Configuration

Description	Current State	Set State
White Day Alarm (DAY ALARM)	Enabled	(on)
White Night Alarm (WNIGHT ALARM)	Enabled	(on)
Red Night Alarm (RNIGHT ALARM)	Enabled	(on)
Beacon Communication Alarm (BCN COMM)	Enabled	(on)
Infrared Alarm (IR ALARM)	Enabled	(on)
Photodiode Alarm (PD ALARM)	Enabled	(on)
System Communication Alarm (SYS COMM)	Enabled	(on)
System GPS Sync Alarm (GPS ALARM)	Enabled	(on)
Lighting Inspection Test Mode (LI TEST MODE)	Enabled	(on)
System Power Failure Alarm (POWER FAIL)	Enabled	(on)
Site Mode Override	Enabled	(on)
Communication Change	Enabled	(on)
Automatic Update	Enabled	(on)
Population Change	Enabled	(on)
Low Battery (LOW BATTERY)	Enabled	(on)
Tower Lighting Configuration Alarm (CFG ALARM)	Enabled	(on)
Low Tower Lighting DC Voltage Alarm (LOW DC)	Enabled	(on)
Tower Lighting Sync Alarm (TWR SYNC)	Enabled	(on)
PLC Bindings Alarm (BIND ALARM)	Enabled	(on)
Photodiode Mode Change	Disabled	(off)
Infrared Not Available Alarm (IR N/A)	Enabled	(on)
Marker Tier Communication Alarm (MKR COMM)	Enabled	(on)
Marker Alarm (MKR ALARM)	Enabled	(on)

Commit Settings	Cancel	Home

Bind Tower	Bind
Unbind Tower	Unbind
Reboot Beacon	Reboot Beacon
Reboot Marker Board	Reboot Marker Board

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MONITORING

The Monitoring menu allows selection of the Primary and Alternate data monitoring methods discussed in Monitoring Configuration (page 78).

Menu

Back	Home

Primary Monitoring Configuration

Description	Current Value	Set Value
Monitoring Method	Disabled	--- Select --- ▾
Primary IP Addr		
Primary Port		
Alternate IP Addr		
Alternate Port		
Listen Port		
Automatic Update Interval	23 Hour(s)	--- Select --- ▾

Alternate Monitoring Configuration

Description	Current Value	Set Value
Monitoring Method	Cellular Eagle	--- Select --- ▾
Primary IP Addr	10.49.11.3	
Primary Port	54630	
Alternate IP Addr	10.49.11.3	
Alternate Port	54630	
Listen Port	54631	
Automatic Update Interval	23 Hour(s)	--- Select --- ▾

Commit Settings	Cancel	Home

NOTE: Products should only be connected via private internet connections. Using public internet connections are susceptible to unauthorized access of the webpage or SNMP interface. Please refer to Flash Technical Bulletin "Vulnerability of Self-Monitoring via Public Internet" for more information about best practices (https://www.flashtechnology.com/knowledgebase/best-practices-for-self-monitoring-flash-technology-ethernet-equipment/).

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 Section 3 Local Tower Configuration.

Menu

Back	Home

Vanguard Local Network Configuration

Description	Current Value	Set Value
IP Addressing Mode	Static	○ Dynamic ⦿ Static
Network Address		192.168.1.11
Subnet Mask		255.255.255.0
Default Gateway		192.168.1.10

Commit Settings	Cancel	Home

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.

Menu		
Back		Home

SNMP Labels Configuration

Description	Name	Severity
Site ID	Not Set	
Site Name	Not Set	
White Day Alarm (DAY ALARM)	White Day Alarm (DAY	Critical
White Night Alarm (WNIGHT ALARM)	White Night Alarm (WN	Critical
Red Night Alarm (RNIGHT ALARM)	Red Night Alarm (RNIC	Critical
Beacon Communication Alarm (BCN COMM)	Beacon Communicatio	Critical
Photodiode Alarm (PD ALARM)	Photodiode Alarm (PD	Critical
System Communication Alarm (SYS COMM)	System Communicatio	Info
System GPS Sync Alarm (GPS ALARM)	System GPS Sync Ala	Warning
Lighting Inspection Test Mode (LI TEST MODE)	Lighting Inspection Tes	Info
System Voltage High	System Voltage High	Info
System Voltage Low	System Voltage Low	Info
System Power Failure Alarm (POWER FAIL)	System Power Failure	Critical
Site Mode Override	Site Mode Override	Info
Communication Change	Communication Chang	Info
Automatic Update	Automatic Update	Info
Population Change	Population Change	Info
Detected Systems	Detected Systems	Info
Tower Lighting Configuration Alarm (CFG ALARM)	Tower Lighting Configu	Critical
Low Tower Lighting DC Voltage Alarm (LOW DC)	Low Tower Lighting DC	Info
Tower Lighting Sync Alarm (TWR SYNC)	Tower Lighting Sync A	Critical
PLC Bindings Alarm (BIND ALARM)	PLC Bindings Alarm (E	Critical
Photodiode Mode Change	Photodiode Mode Cha	Info
Marker Tier Communication Alarm (MKR COMM)	Marker Communicatior	Warning
Marker Alarm (MKR ALARM)	Marker Alarm (MKR Al	Warning
Marker Board Output Voltage	Marker Output Voltage	Info
Marker Board Output Voltage High	Marker Output Voltage	Info
Infrared Alarm (IR ALARM)	IR Alarm (IR ALARM)	Warning
Infrared Not Available Alarm (IR N/A)	IR Not Available Alarm	Warning
Commit Settings	Cancel	Home

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 of 20 characters, no spaces.

NOTE: The use of special characters as part of the user name is not permitted.

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 (4) trap destination endpoints. The first two (2) 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
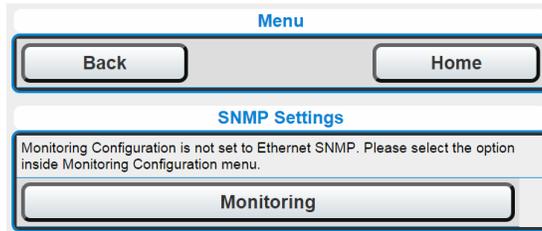
Menu

Back		Home

* 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 ---

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

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".

NOTE: Only use private internet connections to connect to the webpage. Using public internet connections are susceptible to unauthorized access of the webpage or SNMP interface. Please refer to Flash Technical Bulletin "Vulnerability of Self-Monitoring via Public Internet" for more information about best practices (https://www.flashtechnology.com/knowledgebase/best-practices-for-self-monitoring-flash-technology-ethernet-equipment/).

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.
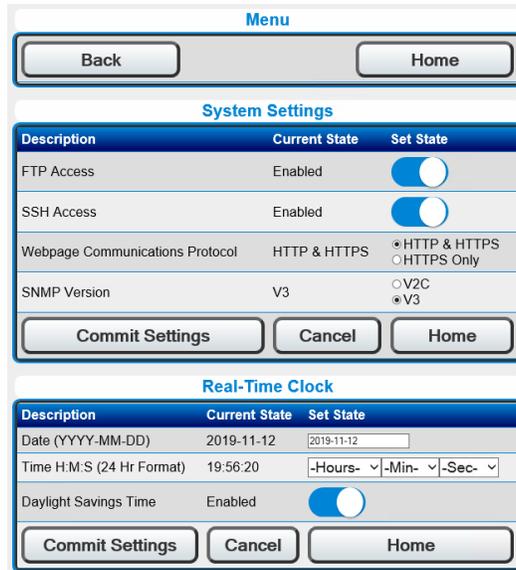
CELLULAR MODEM

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 Monitoring Configuration (page 78) for additional information.
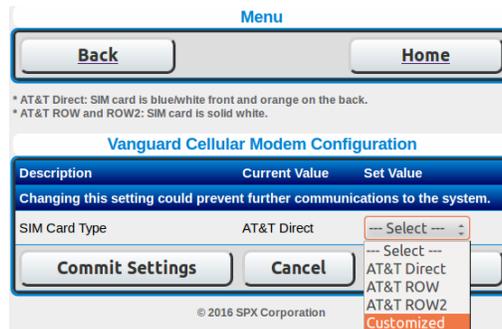
NOTE: The front of the AT&T Direct SIM card is blue / white and the back of the card is orange. The AT&T ROW and AT&T ROW2 card is solid white.

5. MAINTENANCE AND TROUBLESHOOTING

SAFETY

Warning! Read the Personnel Hazard Warning (page 7) 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 5VDC 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, Flash Technology recommends replacing 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 (PCBs), 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. 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 (page 109).

Table 5.1 – Troubleshooting – Initial Inspection

Step	Check/Test/Action		Action
1.a	Is the flashhead flashing?	Yes	Go to Step 1.b
		No	Go to Step 2.a
1.b	Is the failure related to a connected tier of L-810 side markers (marker alarm)?	Yes	Go to Step 4.a
		No	Go to Step 1.c
1.c	Are alarms present on PCB1?	Yes	Review Tables 1-3 and 3-3.
		No	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- (58 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?	Yes No	Inspect flashhead cable, flashhead and marker interface box (if installed) for damage.

Step	Check/Test/Action		Action
	With input power removed, disconnect the flashhead cable, apply power and measure as described previously at TB2.		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- (58VDC). **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- (58VDC)	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 L-810 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- (58VDC).	Yes No	Go to Step 5.b Check flashhead cable between SC 370 and Marker Interface Box.

Step	Check/Test/Action		Action
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- (58VDC).	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.
5.g	Verify if all the markers have the White/Blue 3rd Sense Wire.	Yes No	Switch the "3-WIRE SENSE" toggle switch on the Marker Interface PCB to the "ON" (up) position Switch the "3-WIRE SENSE" toggle switch on the Marker Interface PCB to the "OFF" (down) position

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	Remove obstruction(s) or relocate the GPS antenna.
		No	Go to step 6.b.
6.b	Is the "Ant. Open" or "Ant. Short" LED lit on PCB 3? Both LEDs are located in the GPS section of PCB3 (see Figure 1-5).	Yes	Inspect antenna cable. Replace cable and/or antenna if necessary.
		No	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	Replace PCB 3
		No	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	Replace PCB3
		No	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 on page 105 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.

6. RECOMMENDED SPARE & REPLACEABLE PARTS

CONTACT INFORMATION

Customer Service: 1-800-821-5825

Telephone: (615) 503-2000

Fax: (615) 261-2600

Website: flashtechnology.com

Shipping Address:

> Flash Technology
> 332 Nichol Mill Lane
> Franklin, TN 37067

RMA POLICY

If any system or part(s) purchased from Flash Technology needs 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 Technical Support at 1-800-821-5825, option 9. Tech Support is available M-F, 8 a.m. to 6 p.m. CT.

Emailing a completed RMA request form to aton.support.obstruction@spx.com can also start the process on sites not requiring detailed troubleshooting. Complete the online form at 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.

Ordering Parts

To order spare, replacement or optional parts, contact Inside Sales at 1-800-821-5825.

- Table 6.1 (page 112): "SC 370 (AC)" lists the major replaceable parts for the SC 370.
- Table 6.2 (page 114): "SC 370 (DC)" lists the major replaceable parts for the SC 370 DC.
- Table 6.3 (page 115): "FH 370" lists the major replaceable parts for the FH 370.
- Table 6.4 (page 115): "Marker Interface" lists the major replaceable parts for the Marker Interface box.
- Table 6.5 (page 116): Lists the part numbers for additional or optional system parts that are not illustrated in the component diagrams.
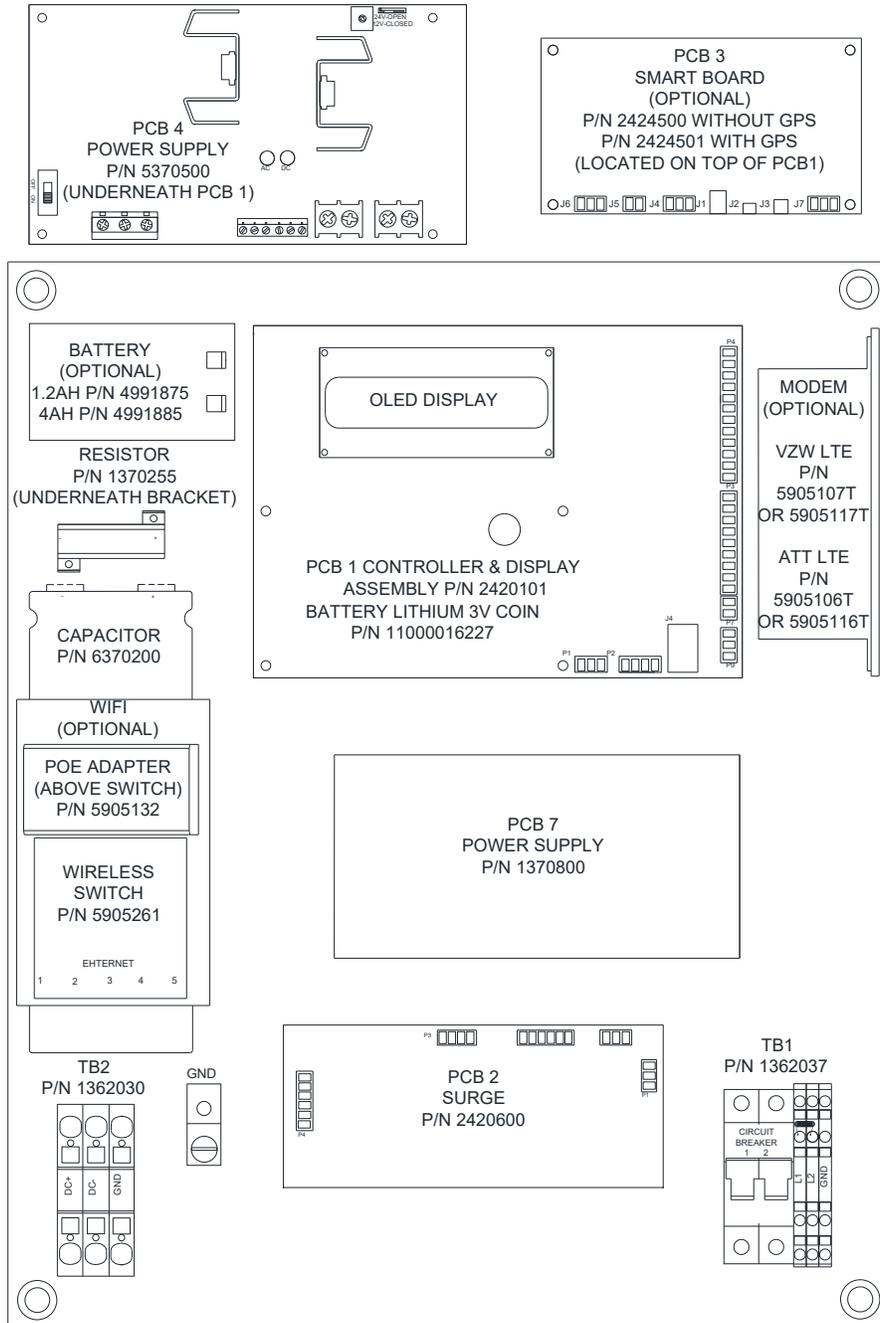
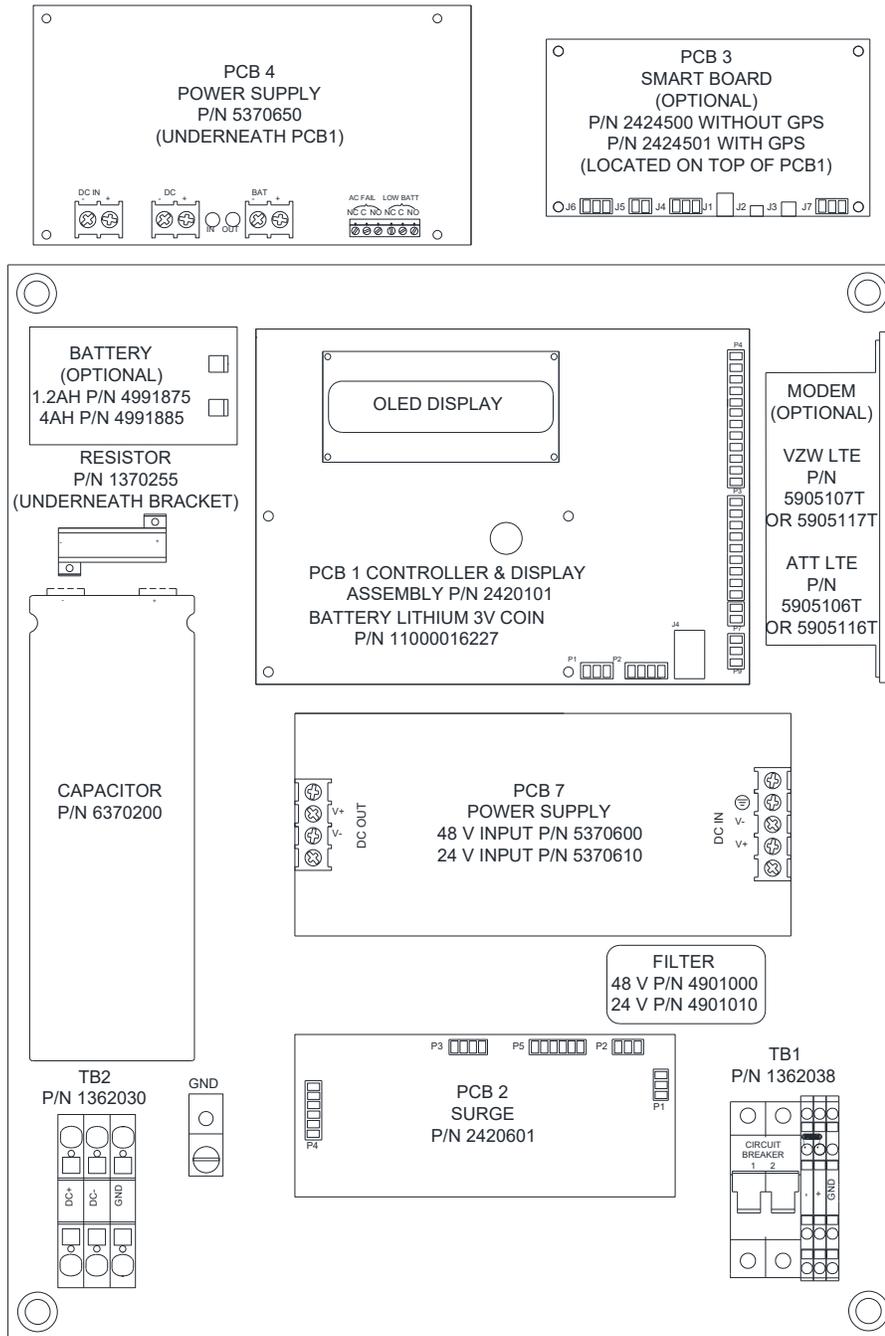**Figure 6.1 – SC 370 (AC) Component Locations**

Table 6.1 – SC 370 (AC) Replacement Parts

Reference	Description	PN
PCB 1 Assembly	370 Controller PCB Upgrade Kit	51005356
PCB 2	PCB SURGE SC 370X [1]	F2420600T
PCB 3	PCB SMART BOARD WITHOUT GPS	F2424500T
	PCB SMART BOARD WITH GPS	F2424501T
PCB 4	POWER SUPPLY 12VDC 2.5A	F5370500T
PCB 7	POWER SUPPLY	F1370800
CAPACITOR	CAP 230,000MF 75VDC	F6370200
RESISTOR	ASSY RESISTOR 330 OHM 50W WITH LEADS	F1370250
BATTERY	BATTERY 12V[2], 1.2Ah	F4991875
	BATTERY 12V[2], 4Ah	F4991885
	BATTERY LITHIUM 3V COIN 12.5MM[3]	11000016227
MODEM	MODEM WIRELESS VERIZON LTE	F5905107T
	MODEM WIRELESS AT&T LTE	F5905106T
Wi-Fi ANTENNA & POE	TP-LINK CPE210 WI-FI KIT	F5905130
WIRELESS SWITCH	NETGEAR 5 PORT GIGABIT SWITCH KIT	F5905260
TB1	TERMINAL BLOCK INPUT POWER SC 370D/W/R	F1362037
TB2	TERMINAL BLOCK ASSY SC 370D/W/R & FH 370D/W	F1362030
VR1	VARISTOR 230/240V METAL OXIDE[1]	F6901081

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. Flash Technology recommends replacing the coin battery every 5 years as part of a periodic maintenance program.

Figure 6.2 – SC 370 (DC) Component Locations

Table 6.2 – SC 370 (DC) Replacement Parts

Reference	Description	PN
PCB 1 Assembly	370 CONTROLLER PCB UPGRADE KIT	51005356
PCB 2	PCB SURGE SC 370X DC[1]	F2420601T
PCB 3	PCB SMART BOARD WITHOUT GPS	F2424500T
	PCB SMART BOARD WITH GPS	F2424501T
PCB 4	POWER SUPPLY DC/DC 12V	F5370650
PCB 7	POWER SUPPLY DC/DC 48/60V	F5370600
FILTER	FILTER EMI 10A (48 VOLT SYSTEM)	F4901000
	FILTER EMI 20A (24 VOLT SYSTEM)	F4901010
CAPACITOR	CAP 230,000MF 75VDC	F6370200
RESISTOR	ASSY RESISTOR 330 OHM 50W WITH LEADS	F1370250
BATTERY	BATTERY 12V[2], 1.2Ah	F4991875
	BATTERY 12V[2], 4Ah	F4991885
	BATTERY LITHIUM 3V COIN 12.5MM[3]	11000016227
MODEM	MODEM LTE ATT ETHERNET TESTED	F5905106T
	MODEM LTE VERIZON ETHERNET TESTED	F5905107T
TB1	TERMINAL BLOCK INPUT POWER SC 370 DC	F1362038
TB2	TERMINAL BLOCK ASSY SC 370D/W/R & FH 370D/W	F1362030

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. Flash Technology recommends replacing the coin battery every 5 years as part of a periodic maintenance program.

Table 6.3 – FH 370 Replacement Parts

Reference	Description	PN
FH 370d IR	L-864/L-865, L-866/L-885 LED FLASHHEAD with IR	F1370151
FH 370d/w/r	PCB SURGE FH 370d/w/r[1]	F2421000T
FH 370d/w/r	PCB CORE BOARD FH 370d/w/r (Black)	F2422500T
FH 370d IR	PCB CORE BOARD FH 370d IR (Red)	F2422600T
MKR 371	MARKER KIT 1-MKR 371 DC L810 FAA	F1900010
MKR 372	MARKER KIT 1-MKR 372 DC L810 FAA IR	F1901110

1. Recommended as a Spare Part.

Table 6.4 – Marker Interface Replacement Parts

Reference	Description	PN
PCB1	MARKER INTERFACE PCB	F2422200T
TB1	TERM BLOCK ASSY MARKER JUNCTION BOX	F1362034

Table 6.5 – System Replacement Parts

Reference	Description	PN
FTS 370D/W/R	INSTALLATION KIT, FTS 370 - SINGLE BCN	F1370990
SC 370D/W/R	CABLE KIT SC 370X RS-485 COMM UNSHLD, 6 FT	F4362039
SC 370D/W/R	CABLE SC 370X RS-485 COMM UNSHLD, 6 FT[1]	F4362025
SC 370D/W/R	CABLE SC 370X RS-485 COMM UNSHLD, 10 FT[2]	F4362026
SC 370D/W/R	CABLE SC 370X RS-485 COMM UNSHLD, 15 FT[2]	F4362027
FTS 370D/W/R	CABLE TC-ER RATED 10 AWG 2 CONDUCTOR[3]	F4210000
FTS 370D/W/R	CABLE TC-ER RATED 8 AWG 2 CONDUCTOR[3]	F4370000
FTS 370D/W/R	CABLE TC-ER RATED 6 AWG 2 CONDUCTOR[3]	F4206000
SC 370 D/W/R	PHD 516 PHOTODIODE W/20' PIGTAIL	F1855516
SC 370 D/W/R	ANTENNA WIDE BAND BULKHEAD MOUNT	F4905230
SC 370 D/W/R	SC 370 GPS SYNC KIT	F1370185
SC 370D/W/R	ANTENNA GPS WITH GASKET[4]	F6903291
SC 370D/W/R	ANTENNA CABLE VANGUARD GPS 50FT[4]	F6903293
SC 370D/W/R	KIT, ANTENNA MOUNTING BRACKET[4]	F1905355
SC 370 D/W/R	KIT, PANEL MOUNTING ADAPTER (OPTIONAL)	F1905036

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).