FLASH TECHNOLOGY

Vanguard® Medium FTS 372

LED Medium Intensity Obstruction Lighting System

Reference Manual

Part Number F7913720

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FTS 372 INSTALLATION CHECKLIST

SYSTEM CONTROLLER SC 372 AND POWER CONVERTER PC 372

- ☐ Enclosure(s) is/are mounted away from radio frequency interference (RFI).
- ☐ Enclosure(s) is/are mounted upright.
- ☐ Lightning protection is grounded to the site grounding system.
  - ☐ 2 AWG (min.) is used from the SC 372 grounding lug to the site lightning grounding system (tested for 1ohm or less).
  - ☐ If a PC 372 is present a 2 AWG (min.) is used from the PC 372 grounding lug to the site lightning grounding system (tested for 1ohm or less).
  - ☐ The bend radius for all ground wires is greater than 8" (avoid bending ground wires if possible). Important! Flash Technology recommends that all exposed ground connections are coated with a corrosion inhibitor (NO-OX or equivalent).
- ☐ There are no holes punched or drilled in the top or sides of the enclosure.
- ☐ Airflow can properly circulate around the enclosure (allow 8” min. of unused space on both sides).
- ☐ Room allowed for door access (multi-unit installations).
- ☐ The input power (and frequency for AC systems) matches the voltage specified on the unit’s data label.
- ☐ Electrical connections, and inside cabinet hardware mounts have been double-checked for tightness before powering up.
  - ☐ All wire connections are installed properly into the terminal blocks (TB1 and TB2).
  - ☐ ALL PCB connectors are securely plugged into their boards (Phoenix Connectors).
  - ☐ All PCB connector wires are properly inserted and screws are tightened.
  - ☐ Circuit Breakers are securely fastened to din rail.
- ☐ PCB1 Intensity select switch is in the “Auto” position on the System Controller.
- ☐ The SC 372 is connected to the top flashhead and programmed as AOL.
  - ☐ The AOL flashhead cable is connected to TB2 in the SC 372, and corresponds to the internal wiring diagram **and color guides on the terminal block**.
  - ☐ Additional flashhead cables are connected to TB1 and TB2 in the PC 372, and correspond to the internal wiring diagram and **color guides on the terminal block**.
  - ☐ If a PC 372 is installed, the RS-485 interconnect connections between TB1 on SC 372 and TB2 on PC 372 are properly installed.

  NOTE! The FH 372 cable will connect to TB1 starting from right to left. Example; FH 2 will connect to TB1 pins 6, 7, and 8 and FH 3 will connect to TB1 pins 9, 10 and 11. Continue this pattern for additional FH 372s.

FLASHHEAD CABLE (RS-485 AND POWER)

- ☐ Cables are **NOT** spliced except at the marker interface enclosure, if installed.
- ☐ Flashhead individual conductor insulation has not been nicked.
- ☐ A service loop of about 5 feet is placed at the base of the tower near the SC 372 for each flashhead.
  - ☐ Service loop(s) is/are attached to the H-Frame or Wall **vertically**.
- ☐ The flashhead cable is properly secured to the tower so the insulation won’t get cut or damaged with wind and time.
  - ☐ Using the Flash Technology’s two supplied tapes and the 2-3-4 layer method, secure the cable to the tower (*Not exceeding 5’ in-between taped sections*)
  - ☐ A service loop is placed just below each installed flashhead.
  - ☐ Service loop is secured at (2) points to the tower structure using the 2-3-4 tape method.

- ☐ Cables are not pulled tight against sharp edges.
- ☐ 1-3” of space should be between the cable and tower leg flanges or obstructions.

FLASHHEAD FH 372

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

MARKER INTERFACE JUNCTION BOX (SC 372D OR SC 372R, PC 372D OR PC 372R)

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

PHOTODIODE

- ☐ The PHD 516 is connected to PCB1 (Controller Board) P-6 (White, Black, and Drain wires correspond to the label on board).
- ☐ The PHD 516 is mounted vertically to prevent water entry.
- ☐ The PHD 516 cable is protected through conduit so it will not be stepped on or damaged.
- ☐ The PHD 516 is facing north and no artificial lights (security lights, street lights, lighted signs, or direct sunlight) will affect its operation.

ALARMS AND ALARM WIRING

☐ **NO** alarm LEDs are lit on PCB1 of the SC 372.
☐ The display located on PCB1 of the SC 372 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 372d, FTS 372w and FTS 372r LED Medium Intensity Obstruction Lighting Systems with the following input voltages: 120-240V AC and 48V DC. All model variants support IR (infrared) output.

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TRADEMARK ACKNOWLEDGEMENTS

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 also meets or exceeds Dirección General de Aeronáutica Civil (DGAC) requirements for a 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 his own expense.

PATENT INFORMATION

FH 372, described within this document, is covered by the following patent: Patent No. 8,926,148

MKR 372 and MKR 371 described within this document is, covered by the following patent: Patent No. 8.998.443

Additional patents pending.

DISCLAIMER

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

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

WARRANTY

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

PARTS REPLACEMENT

The use of parts or components, in this equipment, not manufactured or supplied by Flash Technology voids the warranty and invalidates the third party testing laboratory certification which ensures compliance with FAA Advisory Circulars 150/5345-43J, 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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INTRODUCTION

FTS 372d, FTS 372r and FTS 372w 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. In addition, the system can easily be setup to conform to the International Civil Aviation Organization (ICAO) standard and to various regional standards.

FTS 372d is a Dual Lighting System (red/white) for L-864/865 applications. FTS 372r is a Red Lighting System for L-864 applications while FTS 372w is a White Lighting Systems for L-865 applications.

FTS 372d Catenary series are Dual Lighting Systems for L-866/885 applications. FTS 372w Catenary series are White Lighting Systems for L-866 applications. FTS 372r series are Red Lighting Systems for L-885 Catenary applications.

SYSTEM OVERVIEW

The FTS 372d, FTS 372w and FTS 372r LED Lighting Systems have been designed for long life and a reduced the need for service. Ease of installation and service is enhanced by simple wiring, setup, and extended diagnostics. Safety is further enhanced by using an operating voltages of less than 60VDC.

Each Lighting System consists of one SC 372d, SC 372w or SC 372r (hereafter referred to as SC 372). The SC 372 provides overall control including mode control, synchronization and alarm collection/notification for the entire lighting system, but only provides power (60VDC) for one flashhead. It provides the RS-485 communication link to all the tower devices.

The PC 372(s) provides the 60VDC to power any additional flashheads needed when tower configurations call for more than one flashhead. Each PC 372 can power up to three additional flashheads. A second PC 372 is used if more than three additional flashheads are needed.

The FH 372 provides the light in the lighting system. It can be located up to 850’ (cable length) away from the SC 372 controller or PC 372 power converter and is comprised of LEDs (Light Emitting Diodes). The LED control circuitry and drivers are located in the flashhead. The FH 372 uses a RS-485 communication link between itself and the SC 372 or PC 372. The device allows for remote firmware updates on all tower devices and enhanced diagnostic capability for accurate monitoring and troubleshooting.

Installation of FTS 372d/r systems (L-864/865 or L-864) requiring L-810 markers are supplied with RS-485 enabled junction boxes and IR enabled LED low intensity markers. Each junction box supports from one to four MKR 372 (L-810 type lights) and maintains communication with the SC 372 or PC 372 via RS-485 to monitor performance of the markers.

FTS 372 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 120-240 VAC, 50/60 Hz with no modification necessary to the input power supply module. DC systems have an operational voltage of 48 VDC ±10%. SC 372 DC systems are fully compatible with input power systems having either the positive or negative leg grounded. In all cases, the most positive conductor must be connected to ‘+’ terminal and most negative conductor to the ‘–‘ terminal on the Input Power Terminal block.

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 372 System Controller (Standard): Dimensions H x W x D (millimeters) Weight (kilograms)	 23.82 x 17.25 x 8.51 in (605 x 438 x 216) 39 lb (18.1)
SC 372 System Controller (Stainless Option): Dimensions H x W x D (millimeters) Weight (kilograms)	 23.00 x 17.13 x 6.44 in (584 x 435 x 164) 40 lb (18.1)
PC 372 System Controller (Standard): Dimensions H x W x D (millimeters) Weight (kilograms) Weight of additional Power Supply (kilograms)	 23.82 x 17.25 x 8.51 in (605 x 438 x 216) 26 lb (11.8) 10 lb (4.5)
PC 372 System Controller (Stainless Option): Dimensions H x W x D (millimeters) Weight (kilograms) Weight of additional Power Supply (kilograms)	 23.00 x 17.13 x 6.44 in (584 x 435 x 164) 27 lb (12.3) 10 lb (4.5)
Marker Interface (Standard): Dimensions H x W x D (millimeters) Weight (kilograms)	 16.1 x 10.5 x 4.91 in (409 x 267 x 125) 10.1 lb (4.6)
Marker Interface (Stainless Option): Dimensions H x W x D (millimeters) Weight (kilograms)	 13.75 x 11.05 x 4.36 in (349 x 281 x 111) 11.7 lb (5.3)
FH 372 Flashhead: Dimensions H x W x D (millimeters) Weight (kilograms) Aerodynamic Wind Area (cm^2)	 7.5 x 15.75 in (191 x 400) 26.3 lb (11.9) 99.13 in2 (639.5)
MKR 372: Dimensions H x W x D (millimeters) Weight (kilograms)	 9.0 x 2.75 x 2.13 in (229 x 70 x 54) 1.6 lb (0.7)
PHD 516 Photodiode: Dimensions H x W x D (millimeters)	 4.27 x 2.02 x 1.31 in (108 x 51 x 33)

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 min.	-
Red Night	2,000	2,000	2,000	-
White Night	2,000	2,000	2,000	4,000 nom.
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	120V - 240V AC, 50/60 Hz (3A - 1.5A Peak) 48 V DC (40-60 V) (8A Peak) with either positive or negative incoming power leg grounded.			
Power Consumption (Watts ±5%)				
White Day	81W	122W	108W	
Red Night	36W	45W	42W	
White Night	27W	31W	29W	
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	4372100	10AWG	0.786”	0.861
	6 – 600 ft	4372080	8AWG	0.786”	0.861
	6 – 850 ft	4372060	6AWG	0.796”	0.866

Notes:

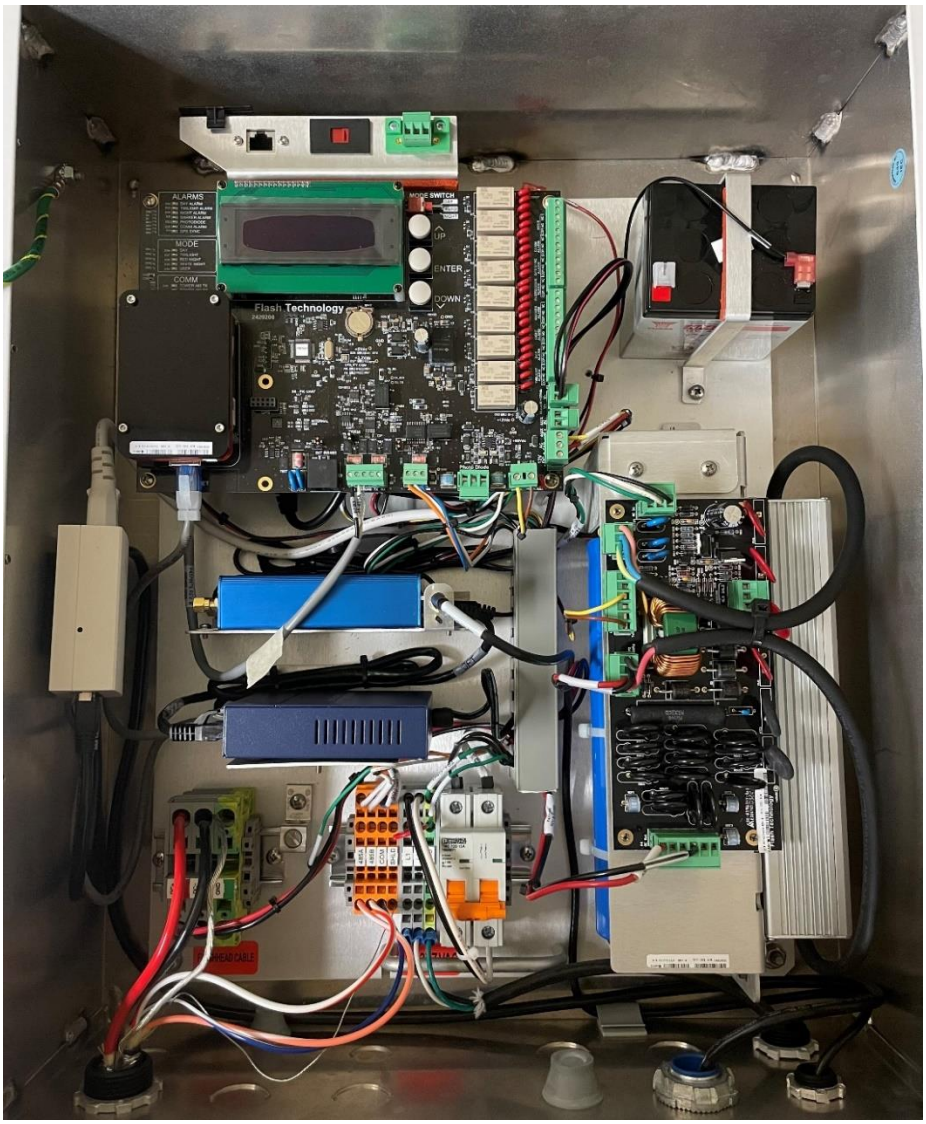
1. For 60 fpm, enable Catenary, Middle
2. ICAO Type C, Steady on.

SC 372

OPERATIONAL OVERVIEW

Refer to Figure 1-1 (below) for an internal view of the SC 372. Component layout diagrams with part names and numbers are shown in Figure 6-1 (AC, page 125) and internal wiring in Figure 2-33.

Input power is connected to terminal block TB1. Mounted on TB1 is a Metal Oxide Varistor (VR1) that reduces line surges and transients. Input power Circuit Breakers are also mounted on TB1. Disconnect power from the SC 372 before servicing Circuit Breakers or MOV. A flag Indicator on the 2-pole Circuit Breaker to improve operational safety is clearly marked with green OFF and red ON.



Note: Shows a fully loaded unit with optional modem, Wi-Fi and generator monitoring kits.

Figure 1-1 – SC 372 (AC)

The power supply module located in each SC 372 combines a power supply, a capacitor and a surge board. The power supply converts input power to the correct DC operating voltages for the system.

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

PCB1 CONTROLLER BOARD

PCB1 controls and monitors operation of the SC 372 and its associated lighting equipment. Each section of PCB1, outlined in the photo below, is discussed in the following subheadings.

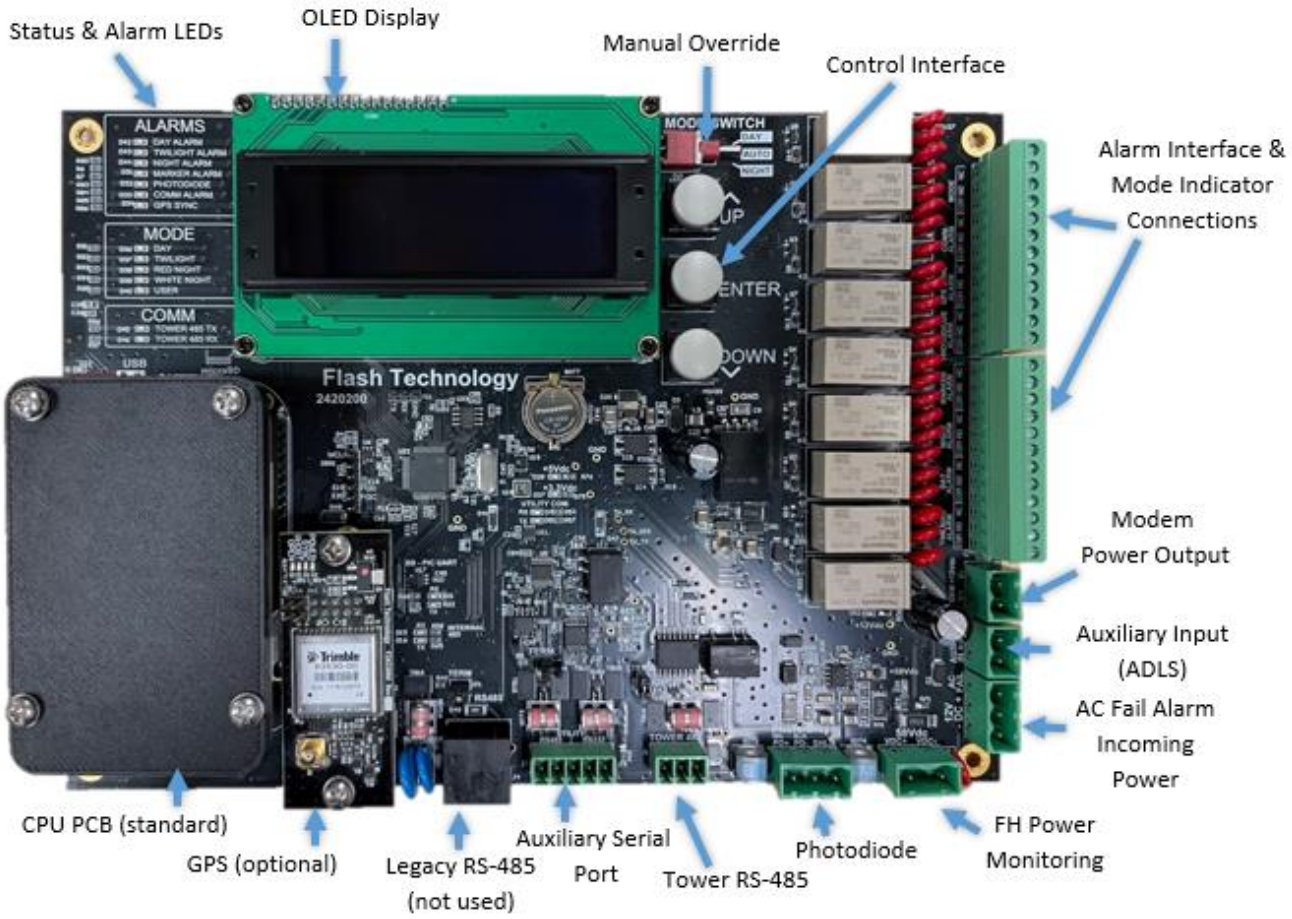


Figure 1-2 – PCB1 Controller Board

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

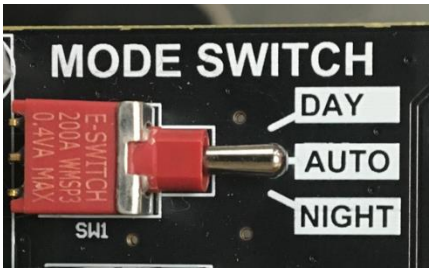
PCB1 INFORMATION DISPLAY AND USER Interface

A multi-line OLED (Organic Light-Emitting Diode) display provides system status, alarm and programming information. Three pushbuttons located to the immediate right of the display provide the user interface for the system. The top and bottom buttons move the cursor position (*) up and down on the display. The center button selects the action 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 85) for a detailed description for all menu functions of the information display. Refer to Table 3-6 (page 99) for a complete list of alarms provided by the information display.

Figure 1-3 – Information Display and User Interface

MANUAL OVERRIDE

The Manual Mode switch, located on the controller board, provides temporary control of the system's operating mode. When the manual mode switch is moved to either DAY or 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 power up.



STATUS AND ALARM LEDS

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

Table 1-3 – Status and Alarm LEDs

LED	Indication
DAY ALARM	• Red when the connected beacon(s) are not communicating with the SC 372 in Day mode. • The Day Alarm will be accompanied by the Night Alarm and the Comm. Alarm.
TWILIGHT ALARM	• *RESERVED FOR FUTURE USE WITH HIGH INTENSTIY SYSTEMS*
NIGHT ALARM	• Red when the connected beacon(s) are not communicating with the SC 372 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(s) are not communicating with the SC 372. • 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(s) and/or marker interface board(s) are not communicating with the SC 372. • 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	• Continuous green when unit is in DAY mode • Blinking green when the unit is in manual DAY mode.
TWILIGHT	• *RESERVED FOR FUTURE USE WITH HIGH INTENSTIY SYSTEMS*
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.
USER	• *RESERVED FOR FUTURE USE*
TOWER 485 TX	• Blinking GREEN when the unit is sending data to other units in the system.
TOWER 485 RX	• Blinking GREEN blinking when the unit is receiving data from other units in the system.

Note: See Table 3-6 (page 99) for a complete list of alarms provided by the information display.

Table 1-4 – Multitech Modem LEDs

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

ALARM INTERFACE & MODE INDICATOR CONNECTIONS

Dry contact alarm connections, located on PCB 1, are available regardless of any additional monitoring method used. The available dry contact alarm outputs are shown in Figure 1-4 and listed in Table 1-5 (below). Each contact may be wired as normally open or normally closed. The contacts are labeled to indicate their state when the system is powered on no alarms are present.

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

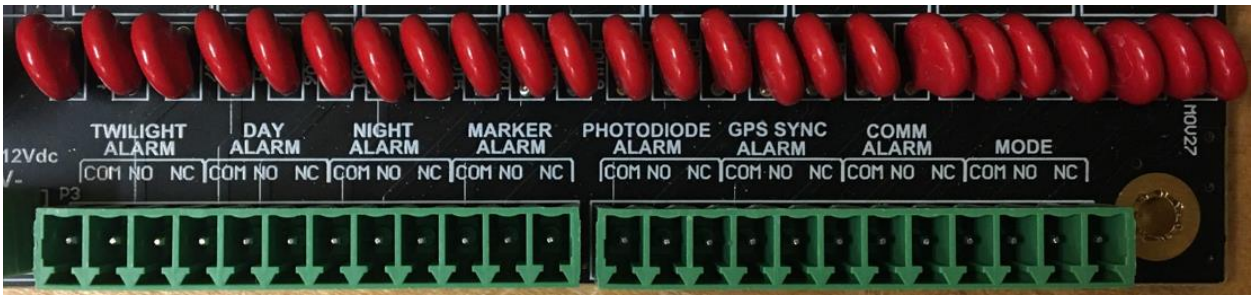


Figure 1-4 – Alarm Interface and Mode Indicator Connections

Table 1-5 – Alarm Interface & Mode Indicator Connections

Connector	Alarm	Terminal	Function
P3	Twilight Alarm	COM (1) NO (2) NC (3)	Common Closes to indicate an alarm in twilight mode. Opens to indicate an alarm in twilight mode.
P3	Day Alarm	COM (4) NO (5) NC (6)	Common Closes to indicate an alarm in day mode. Opens to indicate an alarm in day mode.
P3	Night Alarm	COM (7) NO (8) 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.

AUXILIARY INPUT

The Auxiliary Input allows an external device, such as a radar system, to inhibit the output of the beacon. **Control is supplied by a dry contact from the external device connected to "Aux In +" and "Aux In -".** 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. Refer to Figure 1-4 and Table 1-5 for available dry contacts.

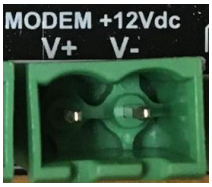
Auxiliary Input configuration programming is located in the "Site Tower Configuration" menu of the controller. Refer to the Site Tower Config for additional information regarding this feature.

POWER INPUT – AC ALARM

DC- is connected to GND from the +12V Power Supply PCB4 and **DC+** is connected to +12V on PCB4.

AC FAIL is a relay switched GROUND connection from the Power Supply. When line Power is present, AC FAIL connects to GROUND. If Line Power is NOT present, AC FAIL is disconnected and POWER FAIL is indicated on the display.

MODEM POWER



MODEM +12Vdc provides power to optional modem and is relay controlled. This allows the controller to power cycle a Modem if required. V+ is +12V, V- is Ground.

GPS SYNC KIT

The FTS 372 system can be upgraded with a GPS Synchronization Kit. The kit (PN 1370285) includes instructions and all components necessary for installation. Antenna installation instructions are provided in GPS Antenna (page 32).

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

PHOTO DIODE

The photo diode is connected directly to PCB1 and does not pass through the Surge Board PCB4 as in previous models. Bypassing the surge board provides protection against unwanted RF noise that can impact the photo diode signal. Connections are **PD+** (white), **PD-** (Black), and **SHLD** for the shield drain wire.

58VDC

This is a monitoring input for the 58 VDC provided by the included Power Supply Module that powers a single FH and Marker Interface. It is only used to detect low or loss of voltage and is not used to power the PCB.

PCB2 SURGE BOARD

The PCB2 "Surge Board" (AC PN 2420600, DC PN 2420601) is installed as part of the Power Supply Module in the SC 372. PCB2 has multistage surge protection, which provides protection to the controller from negative and positive strikes.

The surge board, shown in Figure 1-5 (page 24), has a Power LED that illuminates to indicate the system is operating with full DC Voltage output (58VDC). 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

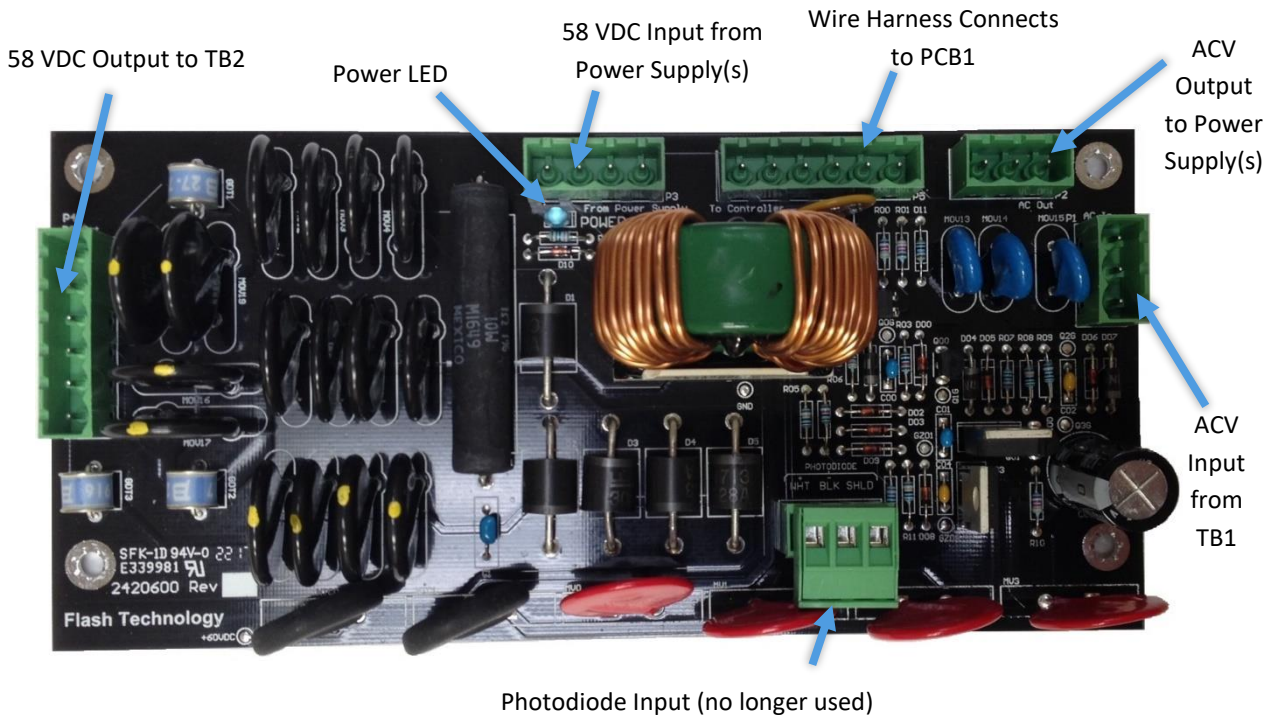


Figure 1-5 – PCB2 Surge Board (PN 2420600 or 2420601)

(This is a direct replacement for PN 2420500 or PN 2420501)

The Photodiode connection is made at PCB1. **Do not** use the Photodiode Input on the surge board (PCB2) as it may lead to incorrect mode alarms due to RF interference.

PCB2 has screen printed labels in white test to assist with installation or replacement. If a replacement is necessary complete the following steps:

1. Remove AC power by turning off the breaker.
2. Verify TB2 voltage is below 5VDC.
3. Remove all green Phoenix connectors.
4. Remove the (4) mounting screws on the outer corners of the board.
5. Install the replacement in reverse order.

PC 372

The Power Converter (PC 372), shown in Figure 1-6 (page 26) houses the power supply modules needed when the tower configuration calls for more than 1 flashhead.

One to three power supply modules are mounted on the backplate to provide 58VDC power to each flashhead. Input power is connected to terminal block TB1 which has a Metal Oxide Varistor (VR1) to reduce line surges and transients. TB1 also contains the 2-pole Circuit Breakers equipped with flag indicators for “OFF” (green) and “ON” (red). Use the circuit breaker to disconnect power from the PC 372 before servicing the unit.

The number of power supply modules mounted in the PC 372 are dictated by the configuration of the tower.

- E1+1 1 module
- E2 2 modules (pictured in Figure 1-7)
- E2+1 3 modules

Power supply modules are mounted in the PC 372 starting from the right. Each power supply module (F1372113) combines a power supply, a capacitor and a surge board. It is similar to the one mounted in the SC 372. The power supply module converts input power to the correct DC operating voltage for the FH 372 connected to it.

TB2, mounted on the bottom left of the PC 372, provides the RS-485 communication interface between FH 372 and PC 372. It must be interconnected to the SC 372 TB1 with the supplied RS-485 cable (F4150222).

The flashhead cable from each FH 372 is brought into the PC 372 from the bottom left of the enclosure. Power connections are made on TB1 while RS-485 communication connections are made on TB2.

Figure 6-2 shows the component locations for PC 372. Wiring diagrams are shown in Figure 2-37, 2-38 and 2-39 for different configurations that use the PC 372.

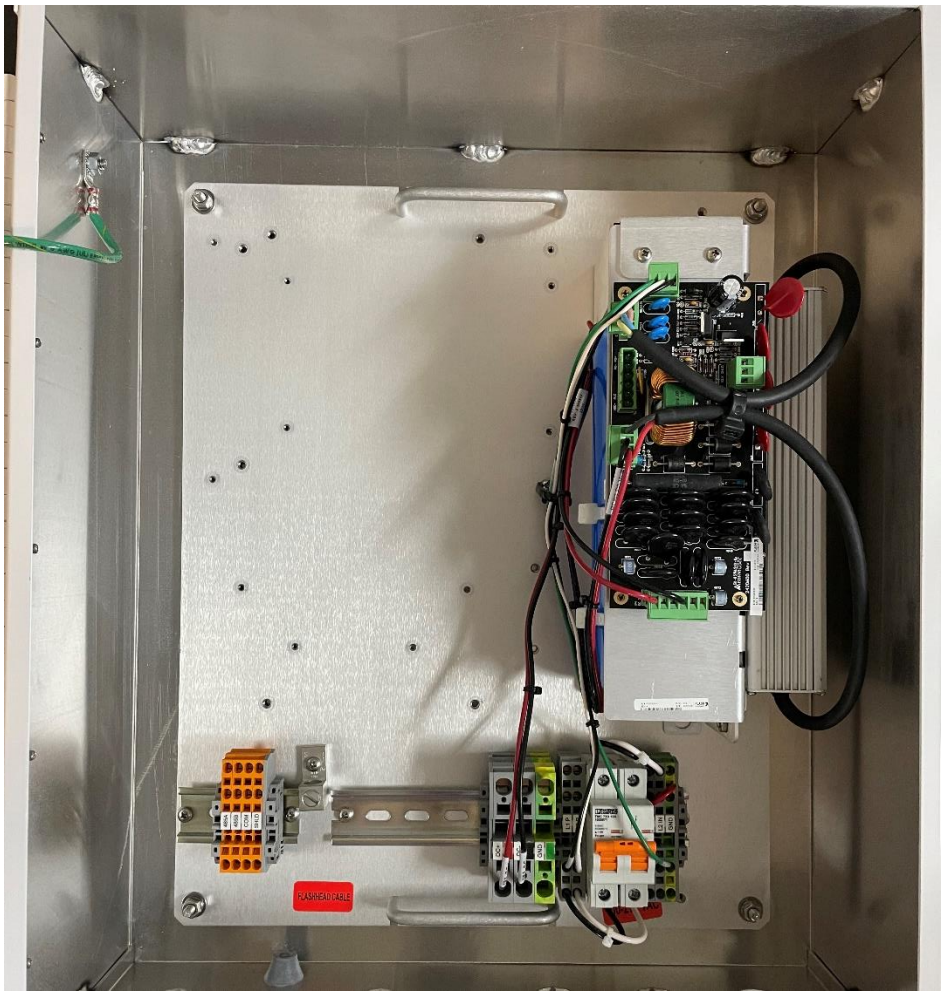


Figure 1-6 – PC 372 Power Converter in E1+1 configuration (1 power supply modules)

FH 372

FH 372, shown in Figure 1-7 (page 27), consists of two sections: 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 Red Night versions are also available[1]. In the event service is required, the light engine is field replaceable as a single assembly.

The base assembly contains two terminal blocks. The first connects to the DC power and the second connects to RS-485 communication via the flashhead cable. In addition, there is a surge protection PCB placed in line between the output of the terminal block and input to the light engine.

The FH 372 incorporates IR emitters to ensure the obstruction is visible to pilots aided by NVG (night vision goggles). A blue core board within the light engine differentiates it from the incompatible red and black core

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

boards used in the older FH 370 version. In addition, a red “IR” sticker on the saucer indicates use of IR emitters. The combination of standard Red (620nm) LEDs and IR (850nm) LEDs ensures maximum visibility to pilots in all circumstances and meets AC 150/5345-43J specifications.

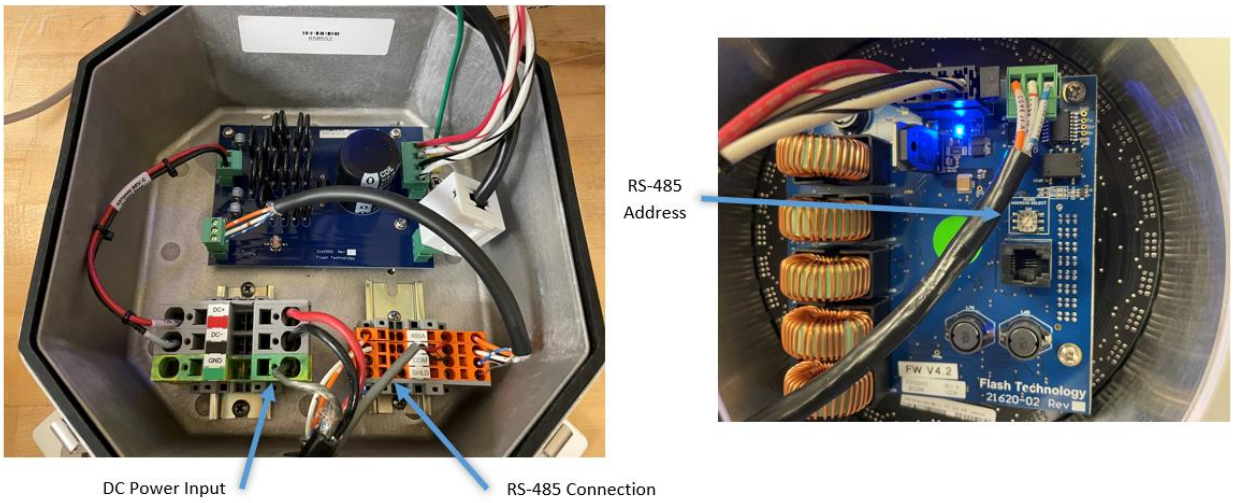


Figure 1-7 – FH 372d/w/r

MARKER INTERFACE ENCLOSURE (SC 372D OR SC 372R, PC 372D OR PC 372R)

The Marker Interface Enclosure mounting diagram is shown in Figure 2-15 (page 50; Stainless Steel option shown in Figure 2-16, page 51) and the wiring diagram is shown in Figure 2-40 (page 83).

Operational power and RS-485 communication 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 shown in Figure 1-8 (page 28) 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 371) the switch is placed in the “OFF” (down) position.

Marker programming, control and status are accessed through the User Interface located on PCB 1 of the SC 372. The RS-485 conductors in the cable are utilized for the communications link between the SC 372 / PC 372 and the Marker Interface PCB. LEDs located on the Marker Interface PCB provide operational status during service.

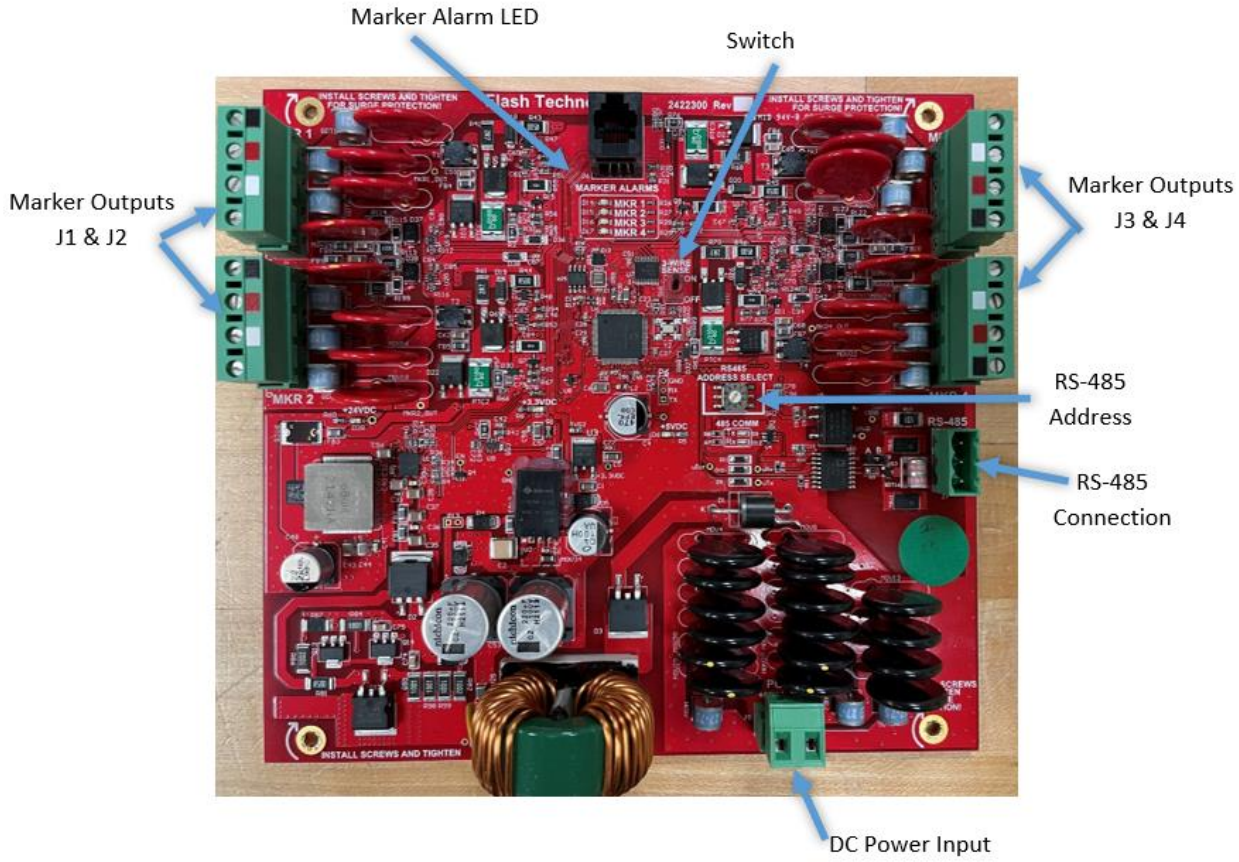


Figure 1-8 – Marker Interface PCB

MKR 372 (SC 372D OR SC 372R, PC 372D OR PC 372R)

MKR 372 DC, shown in Figure 1-9 (page 28), is a 24V DC LED L-810 marker. The innovative design combines 3 highly efficient Red LEDs, 3 IR LEDs and Fresnel optics into a compact cast aluminum base which is easy to install and requires minimal hardware. The addition of IR ensures visibility of the obstruction to pilots aided by NVG. The combination of standard Red (620nm) LEDs and IR (850nm) LEDs ensures maximum visibility to pilots in all circumstances.

Operational power is supplied via 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:

1. 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 'OFF' setting.
2. Refer to "Vanguard® Marker Installation" (PN 7904214) for specific information regarding cable connection to the MKR 372.

Figure 1-9 – MKR 372

SECTION 2 – MOUNTING AND INSTALLATION

UNPACKING

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

Note: Record equipment serial numbers for future reference.

RECOMMENDED TOOLS

Flash Technology recommends the following tools for installation and maintenance:

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

CONTROLLER INSTALLATION

Warning! Read the Personal Hazard Warning (page 6) now. Disconnect primary power before opening enclosures.

SC 372 ACCESS

The enclosure 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 stainless steel enclosure is secured with latches.

MOUNTING

The SC372 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 372:

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

MOUNTING ADAPTER PANEL (OPTIONAL)

The optional Mounting Adapter Panel, shown in Figure 2-11 (page 46), allows for easier installation of the FTS 372 system by removing the need for modifying the existing outdoor H-Frame when upgrading from previously installed Flash Technology products. The H-Frame may require adjustment when upgrading from non-Flash Technology lighting products if the adapter panels are requested. Please contact the Inside Sales at 1-800-821-5825 if this option is desired.

WIRING

Typical component location diagrams for E1/D1, E1+1/D1+1, E2/D2, and E2+1/D2+1 are shown in Figures 2-17 to 2-22 on (pages 52 – 57). Wiring diagrams for each of them can be found in Figures 2-25 to 2-32 (pages 60-74).

Typical Catenary component location diagrams are shown in Figure 2-23 (page 58) and Figure 2-24 (page 59) with wiring diagrams for 5 and 6 light systems shown in Figure 2-31 (page 72) and Figure 2-32 (page 74). Installation notes for system types shown are located after each figure. Installation instructions concerning MKR 372 L-810 marker fixtures are supplied with the marker kit. The system installation diagrams provided in this manual may not contain all of the required wiring information for installation at your site.

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

All communication wiring should have an insulation rating of 300 volts minimum. All power wiring should have an insulation rating of 600 volts. Input power wiring must be sized to satisfy the load demand of all connected SC 372 systems. Read the notes on the installation wiring diagrams supplied both in this manual and with the equipment.

INPUT POWER

Input power conductor size depends on the service voltage, distance from the source and the number of units installed in the system. Assume 340 VA per SC 372 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. SC 372 DC systems are fully compatible with input power systems having either the positive or negative leg grounded. In all cases, the most positive conductor must be connected to + terminal and most negative conductor to – terminal on the Input Power Terminal block.

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

PHOTODIODE WIRING

The photodiode must be directly connected to PCB1 in the SC 372 at the connection labeled 'Photo Diode' (bottom right of PCB1). The white wire is connected to the terminal marked "WH" (P+), the black wire is connected to the terminal marked "BLK" (PD-), 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 the SC. The standard photodiode (PN 1855516) is supplied with 20' of cable. Photodiodes with cable lengths up to 75' are available from the manufacturer. Do not splice the photodiode cable.

PHOTODIODE MOUNTING

The photodiode, also referred to as PHD 516, is shown in Figure 2-1 (page 33) and mounting and outline dimensions are shown in Figure 2-12 (page 47). The photodiode uses a female 1/2" NPT for mounting. Use the following guidelines to mount the photodiode:

- Locate the photodiode where it has an unobstructed view of the polar sky.
- It must not view direct or reflected artificial light.
- The photodiode may be mounted at the top end of a vertical length of rigid conduit or to the optional Antenna Mounting Bracket kit (PN 1905355). It should 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 32) for additional information regarding the Antenna Mounting Bracket Kit.

CELLULAR ANTENNA

A Cellular antenna is required with any of the optional cellular modems provided with the system. The supplied antenna mounting bracket accommodates bulkhead mount style antenna as shown in Figure 2-1 (page 33). Wiring diagrams for different configurations (optional Modem, optional Wi-Fi, optional Modem + Wi-Fi) are shown in Figures 2-34 to 2-36 (page 77 – 79). The antenna connects directly to the modem as shown in Figure 2-34 (page 77). Follow the steps outlined below to install the antenna.

The system is shipped with the antenna preinstalled and the antenna cable's SMA connector torqued to specification on 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 needs to be coiled up, the coil diameter must not be less than 18 inches.
>
> Maximum torque for the antenna's SMA connector must not exceed 8 inch-pounds (90 N-cm) using a 5/16'" torque wrench. Damage to the modem may occur if the connection is over-tightened.

Choose a location for mounting the cellular antenna that will provide optimal reception. The included mounting bracket can simultaneously accommodate a Vanguard Photodiode, Cellular Antenna, and GPS Antenna as shown in Figure 2-1 (page 33).

Note: The antenna must be mounted outdoors to ensure optimal reception. See Photodiode Mounting (page 31) 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" U-bolt (included) to mount to pole or H-frame post. The bracket permits use of larger U-bolts, up to 5".
   Important! Regardless of the mounting method selected, the antenna bracket must be grounded with a minimum 14 AWG Ground wire connected to the site Grounding System. Observe proper grounding procedures.
2. The cellular antenna **must be mounted at the center of the bracket** as shown in Figures 2-1 and 2-2 (page 33). Follow the location recommendations noted in Photodiode Mounting (page 31) 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 372 enclosure. The diameter of the coil should be as large as possible.
6. Tighten the cable strain relief on the bottom of the SC 372 enclosure securely.

GPS ANTENNA

The GPS antenna, shown in Figure 2-1 (page 33), is required when the optional GPS board is used. 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 33).
   Note: See Photodiode Mounting (page 31) and Cellular Antenna (page 31) 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" U-bolt (included) to mount to pole or H-frame post. The bracket permits use of larger U-bolts, up to 5".
   Important! Regardless of the mounting method selected, the antenna bracket must be grounded with a minimum 14 AWG ground wire connected to the site grounding system. Observe proper grounding procedures.
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 372 enclosure. The diameter of the coil should be as large as possible.
7. Tighten the cable strain relief on the bottom the of SC 372 enclosure securely.
8. Verify that neither LED: Ant. Open or Ant. Short, shown on GPS Board picture (page 23), are lit once system power is restored. See Section 1 GPS Sync. Kit for additional information regarding the Ant. Open and Ant. Short LEDs.

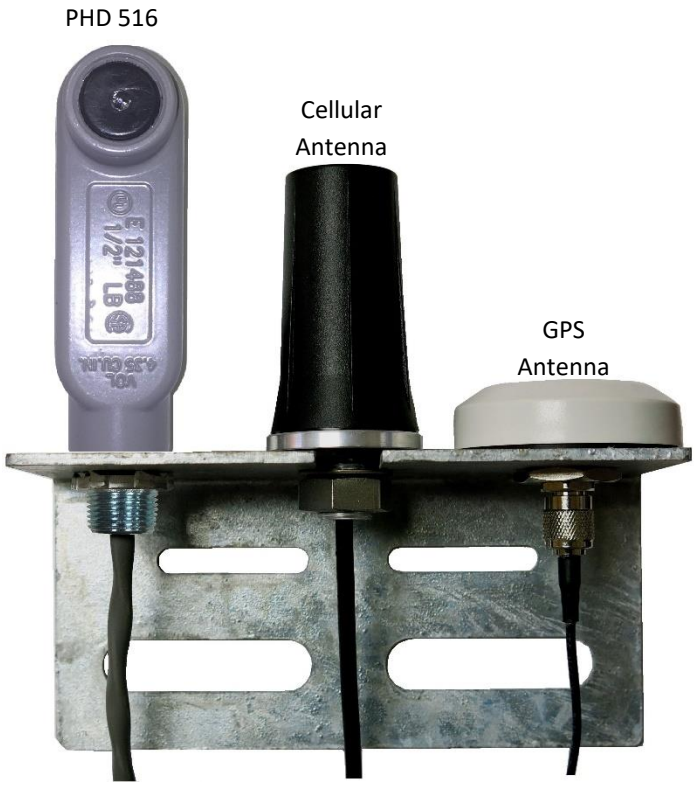


Figure 2-1 – Antenna Mounting Bracket with PHD 516, Cellular and GPS Antennas

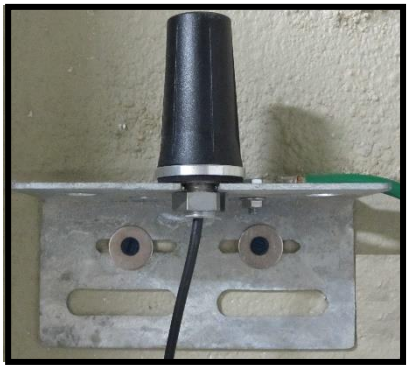
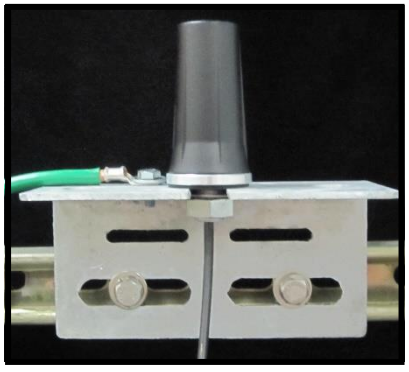
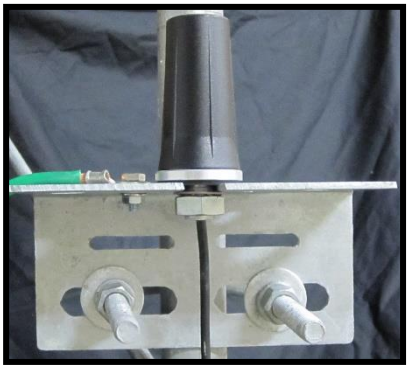
Wall Mount	Horizontal Uni-strut Mount	Vertical Pole or H-frame post Mount
Use screws to mount to the inside or outside wall of a shelter. ***(Screws are not included in the kit.)***	Use spring-nuts to mount to Uni-strut. ***(Spring nuts are not included in the kit.)***	Use 3” U-bolt (***included***)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

Figure 2-2 – Antenna Mounting Options

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 372 is mounted. The following instructions are provided to mount the antenna to the SC 372 enclosure using the supplied hardware kit. Figure 2-3 (page 35) provides a pictorial of the installation. Connection to the Wi-Fi access point is discussed in Section 4 (page 101).

1. Locate the following items supplied with the SC 372 system:
   a. Wi-Fi Antenna (PN 5905131)
   b. Shielded CAT 5 Cable 6’ (PN 4362028)
   c. Antenna Mounting Kit (PN 1370191)
      Conduit Hub with lock ring
      Conduit Nipple 0.75” x 12”
      Coupling
      Cable Strain Relief
      Custom Insert (Cable Strain Relief)
      (2) Adjustable Clamp 1 1/16” – 2”
2. Attach the conduit hub to one end of the 12” nipple and the coupling to the other end.
3. Screw the strain relief into the coupling.
4. Locate and remove the access cover from the back of the Wi-Fi antenna. Remove the knockout that is located below the ground terminal.
5. Center the Wi-Fi antenna on the conduit assembly and attach using the two adjustable clamps. The top of the Wi-Fi antenna must be located nearest the conduit hub.
6. Locate an available 0.88” hole on the SC 372C unit and install the antenna assembly. See Figure 2-9 (page 44) for the SC 372 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 372. Leave a small drip loop between the antenna and the conduit assembly.
8. Route the CAT 5 cable to the Power Over Ethernet (POE) Injector and connect to the terminal labeled “POE”.
9. Install a ground wire (8 AWG recommended) from the antenna ground terminal to the site ground.
10. Replace the access cover.

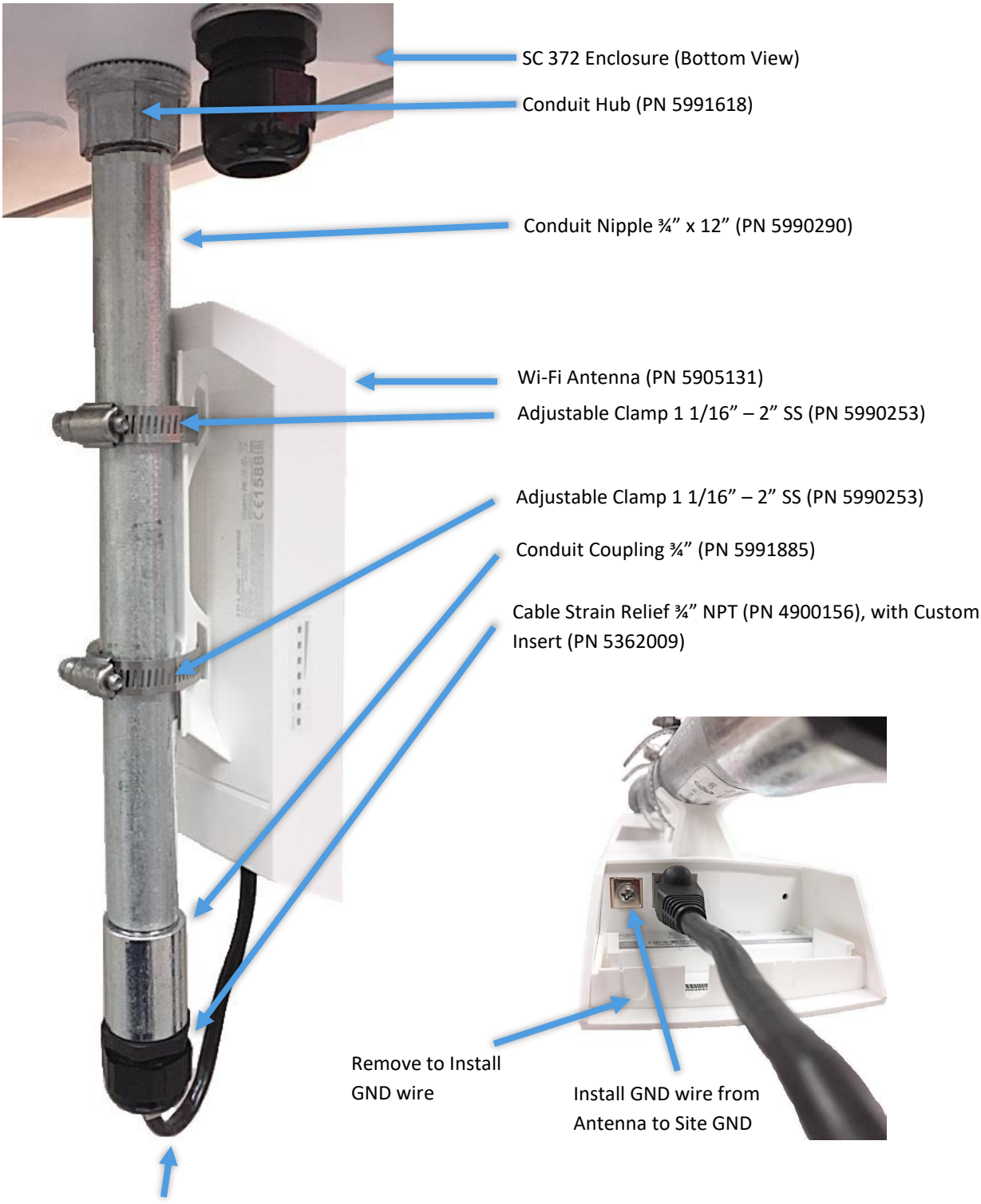


Figure 2-3 – Wi-Fi Antenna Installation

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 22) and shown in Figure 1-4 (page 22). 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.

POWER CONVERTER (PC 372) INSTALLATION

Warning! Read the Personal Hazard Warning (page 6) now. Disconnect primary power before opening enclosures.

PC 372 ACCESS

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

Note: The stainless steel enclosure is secured with latches.

MOUNTING

The PC 372 enclosure is the same size as the SC 372 enclosure. The 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 PC 372:

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

MOUNTING ADAPTER PANEL (OPTIONAL)

The optional Mounting Adapter Panel, shown in Figure 2-11 (page 46), allows for easier installation of the FTS 372 system by removing the need for modifying the existing outdoor H-Frame when upgrading from previously installed Flash Technology products. The H-Frame may require adjustment when upgrading from non-Flash Technology lighting products if the adapter panels are requested. Please contact the Inside Sales at 1-800-821-5825 if this option is desired.

WIRING

The PC 372 is not required for E1/D1 configurations. Component locations for PC 372 are shown in Figure 6-2 (page 127). Wiring diagrams for the PC configurations are shown from Figure 2-37 (page 80) to Figure 2-39 (page 57). Catenary component location diagrams for 5 & 6 light systems which incorporate the PC 372 are shown in Figure 2-23 and Figure 2-24 (page 58-59) with wiring diagrams shown in Figure 2-31 (page 72) and Figure 2-32 (page 74). Installation notes for system types shown are located after each figure. Installation instructions concerning MKR 372 L-810 marker fixtures are supplied with the marker kit. The system installation diagrams provided in this manual may not contain all of the required wiring information for installation at your site.

Important! If installation drawings prepared specifically for your site disagree with information provided in this manual, the site installation drawings should take precedence. Consult any site-specific installation wiring diagrams supplied with your equipment.

Flash Technology wiring diagrams define only minimum requirements recommended for satisfactory equipment operation. It is the responsibility of the installer to comply with all applicable electrical codes.

All communication wiring should have an insulation rating of 300 volts minimum. All power wiring should have an insulation rating of 600 volts. Input power wiring must be sized to satisfy the load demand of all connected PC 372 systems. Read the notes on the installation wiring diagrams supplied both in this manual and with the equipment.

INPUT POWER

Input power conductor size depends on the service voltage, distance from the source and the number of units installed in the system. 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. PC 372 DC systems are fully compatible with input power systems having either the positive or negative leg grounded. In all cases, the most positive conductor must be connected to + terminal and most negative conductor to – terminal on the Input Power Terminal block.

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

FLASHHEAD CABLE

Flash Technology cable provides optimal system performance while minimizing vulnerability to Lightning and EMI (electromagnetic interference).

The integrated cable is comprised of two power conductors with an overall aluminized Mylar shield and drain as well as a separately sheathed RS-485 communication cable consisting of 3 communication conductors and a drain wire. The power conductors connects to TB2 in the lower left of the SC 372 while the communication wires connect with the RS-485 blocks on TB1 as shown in Figure 2-5 (page 38). Similar connections are made when a PC 372 is used as shown in the wiring diagrams show in Figure 2-37 – Figure 2-39 (pages 80 – 82).

For shorter cable runs up to 350 ft., flashhead cable PN 4372100 (10 AWG) can be used. Flashhead cable PN 4372080 (8 AWG) permits cable lengths up to 600 ft while flashhead cable PN 4372060 (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 ¾” cable strain relief located in the bottom of the enclosure near TB2 and insert the cable.
3. Connect the three power conductors in the 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. Connect the three conductors in the RS-485 cable to the orange blocks in TB1 using a non-flared flat tip screwdriver:
   a. Connect the orange/white wire to position 485A
   b. Connect the white/orange wire to position 485B
   c. Connect the white/blue wire to position COM
   d. Connect the shield wire to position SHLD.
5. Leaving slack in the flashhead cable, tighten the dome nut so that the cable is held securely in place.

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

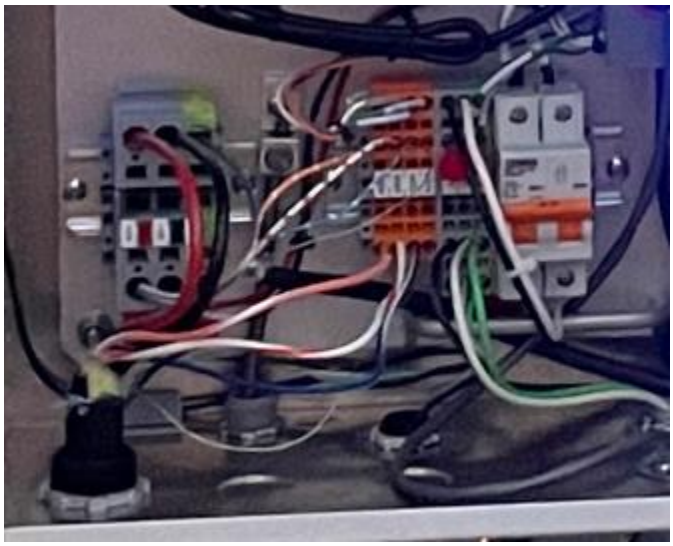


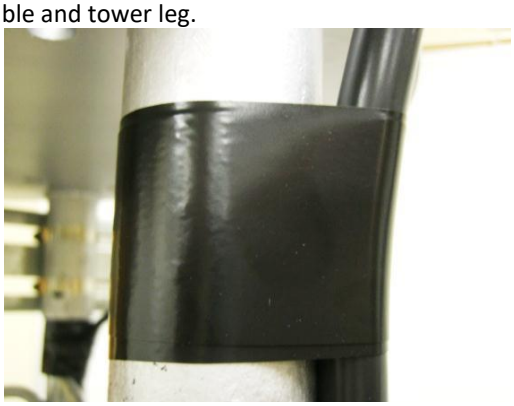
Figure 2-5 – SC 372 Flashhead Cable Connection

SECURING THE CABLE: 2-3-4 TAPE METHOD

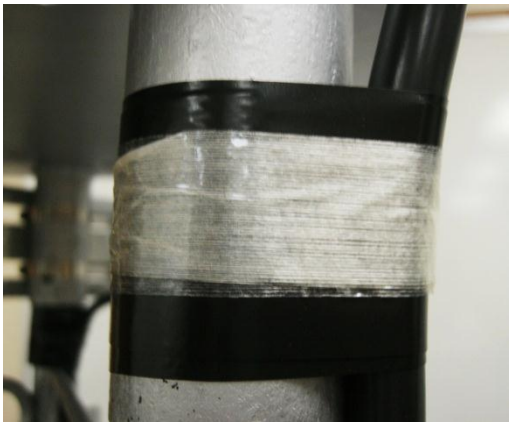
Flash Technology provides the material for securing the flashhead cable to a skeletal structure with the following technique.

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

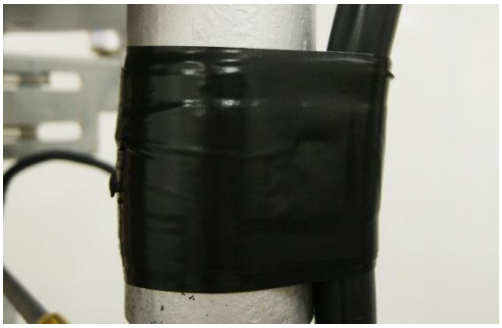
1. Run the cable along one of the tower legs and wrap two full turns of two-inch Scotchrap™ #50 tape, or the equivalent, around the cable and tower leg.



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



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



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

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

MARKER INTERFACE ENCLOSURE

Note: Complete instructions for installing the Marker Interface Enclosure, marker mounting brackets and MKR 372 L-810 markers are provided with the marker kit. Refer to "Vanguard® Marker Installation" (PN 7904214) for specific information regarding cable connection to the MKR 372.

Wiring information is provided in the following steps. Figure 2-6 (page 41) shows the Marker Interface Enclosure. Figure 2-25 (page 60) shows a typical system installation diagram. Figure 2-40 (page 83) shows the recommended cable routing and an internal wiring diagram for the Marker Interface Enclosure.

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

WIRING PROCEDURE

1. Observing the procedures described previously in Flashhead Cable (page 37) and Securing the Cable (page 38), install a 5' service loop in the cable near the marker interface enclosure.
2. Prepare the flashhead cable:
   a. Remove 6 inches of the outer jacket
   b. Strip off 6 inches of the black outer jacket of the RS-485 communication cable
   c. Remove the exposed aluminized Mylar shield and any filler material between conductors.

   d. Remove approximately 3/4 inch from the jacket of each individual connector.
3. Loosen the dome nut of one of the ¾" cable strain reliefs located in the bottom of the enclosure. Route the flashhead cable from the flashhead through the strain relief and tighten the dome nut.
4. Connect the three conductor flashhead cable to the terminal strip TB1 using a non-flared flat tip screwdriver:
   a. Connect the red wire to one of the two terminals on the top row labeled DC+.
   b. Connect the black wire to one of the two the terminals on the top row labeled DC-.
   c. Connect the bare drain wire to one of the two the terminals labeled GND.
5. Connect the conductors for the communication cable to the TB1 using the non-flared flat tip screw driver:
   a. Connect the orang/white wire to position 485A
   b. Connect the white/orange wire to position 485B
   c. Connect the white/blue wire to position COM
   d. Connect the shield wire to position SHLD.
6. Loosen the dome nut of one of the ½" cable strain reliefs located in the bottom of the enclosure. Insert 12" of marker cable through the cable strain relief and tighten the dome nut.
7. Prepare the marker cable by removing 4 inches of the outer jacket and any filler material between conductors.
8. 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.
   a. 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 372d by repeating steps 1-5 **NOTE:** Install a 5' service loop for each flashhead cable section (SC 372/PC 372 to Marker Interface & Marker Interface to FH 372) near the marker interface enclosure

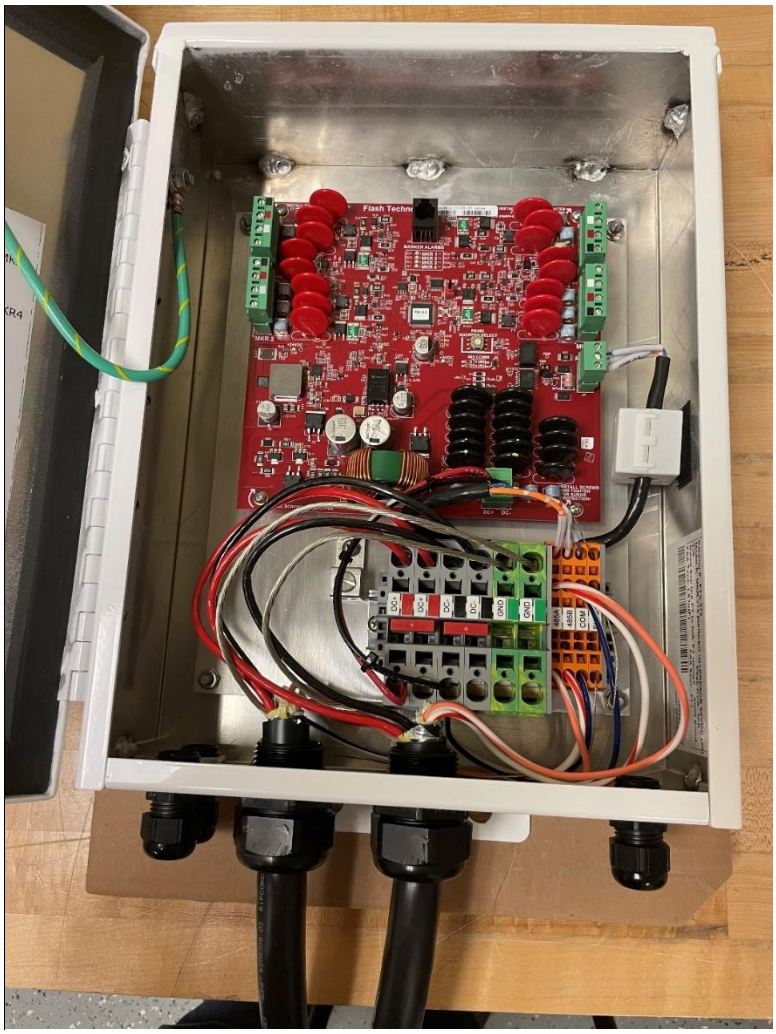


Figure 2-6 – Marker Interface Box and Wiring

FLASHHEAD INSTALLATION

MOUNTING

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

Mount the flashhead to the tower pedestal utilizing ½ inch galvanized or stainless steel hardware. Four 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 ½ inch stainless steel or galvanized hardware (PN 5991777).
4. With the light engine secured by the two latches on the base, place a level on top of the flashhead and verify that it is level in two directions.
5. Note: Flash Technology's "T"- Level (Optional PN 11000013455) has two vials to simplify installation.
6. If the flashhead is not level, add stainless steel shim material or washers (stainless steel or galvanized) as necessary to level the flashhead.
7. Tighten the hardware once the flashhead is level in both directions. Verify that the flashhead is level when the hardware is fully tightened. If necessary, loosen the mounting hardware and repeat Step 5 until the flashhead is level with the hardware fully tightened

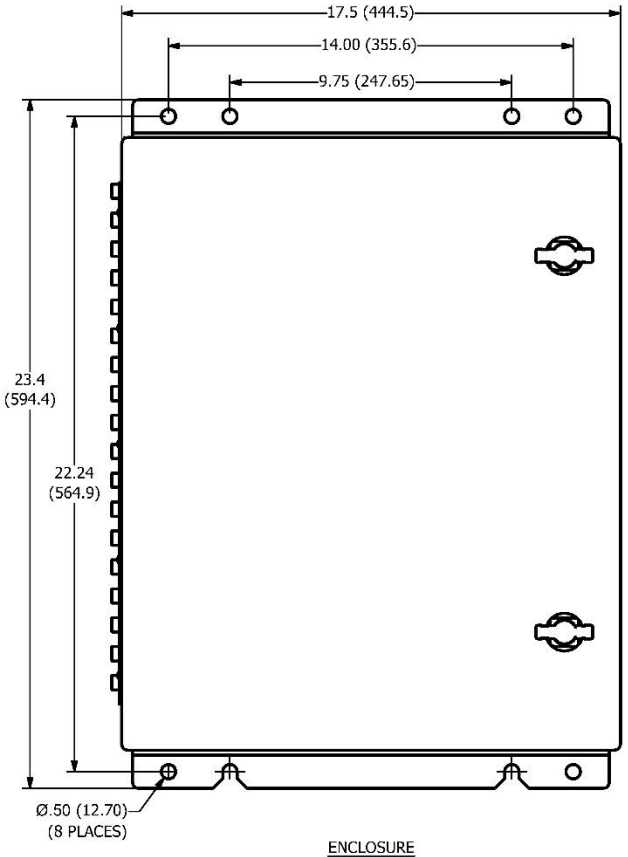
Figure 2-7 – Flashhead Leveling

WIRING

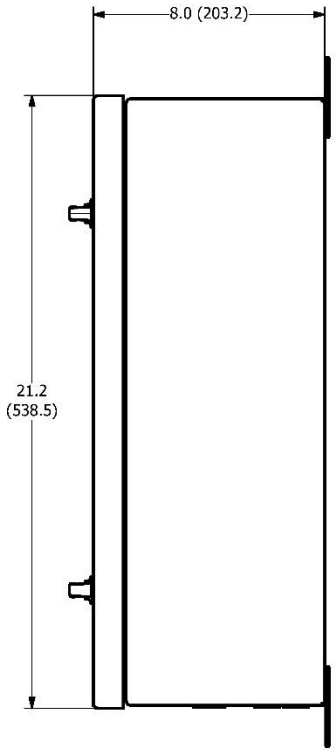
NOTE: Install a 5’ service loop in the cable near the flashhead.

1. With the flashhead securely mounted to the tower, unfasten the two latches that secure the light engine (top assembly) to the base.
2. Lift the light engine assembly to expose the flashhead terminal block.
3. Prepare the flashhead cable:
   a. Remove 6 inches of the outer jacket.
   b. Strip off 6 inches of the black outer jacket of the RS-485 communication cable
   c. Remove the exposed aluminized Mylar shield and any filler material between conductors.
   d. 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 372 and insert the cable.
5. Connect the three conductor flashhead cable to the terminal strip (TB1) 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. Connect the conductors for the communication cable to the TB2 using the non-flared flat tip screw driver:
   e. Connect the orang/white wire to position 485A
   f. Connect the white/orange wire to position 485B
   g. Connect the white/blue wire to position COM
   h. Connect the shield wire to position SHLD.
7. Secure the cable by tightening the dome nut on the strain relief.
8. Ensure all wiring is tucked inside the flashhead base to avoid pinching.
9. Close the flashhead and secure the two latches.
10. 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).

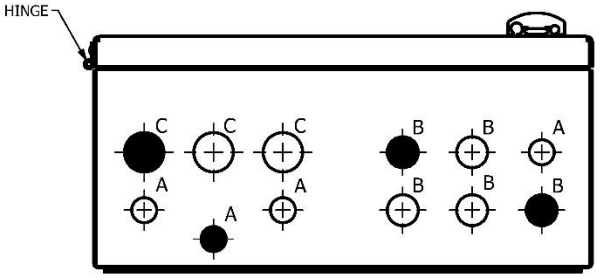
Figure 2-8 – Flashhead Cable Terminal Block



ENCLOSURE
FRONT VIEW



ENCLOSURE
RIGHT VIEW

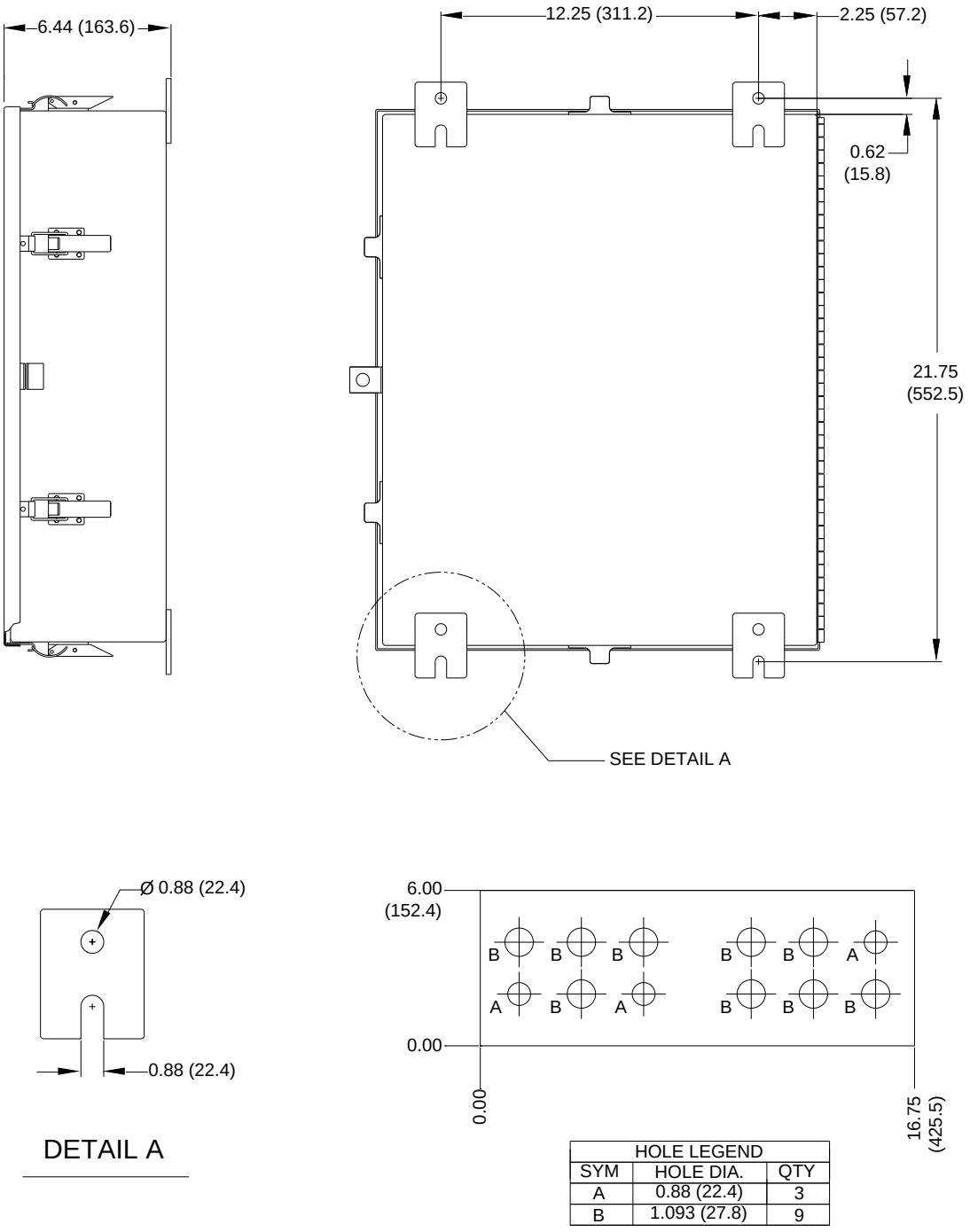


ENCLOSURE
BOTTOM VIEW

KNOCKOUT TABLE (ALL HOLES KNOCKOUT FROM INSIDE)		
LETTER	KNOCKOUT SIZE DIA	QTY
A	0.875 (22.4)	4
B	1.093 (27.8)	5
C	1.375 (34.9)	3
SHADED HOLES REPRESENT FACTORY REMOVED KNOCKOUTS		

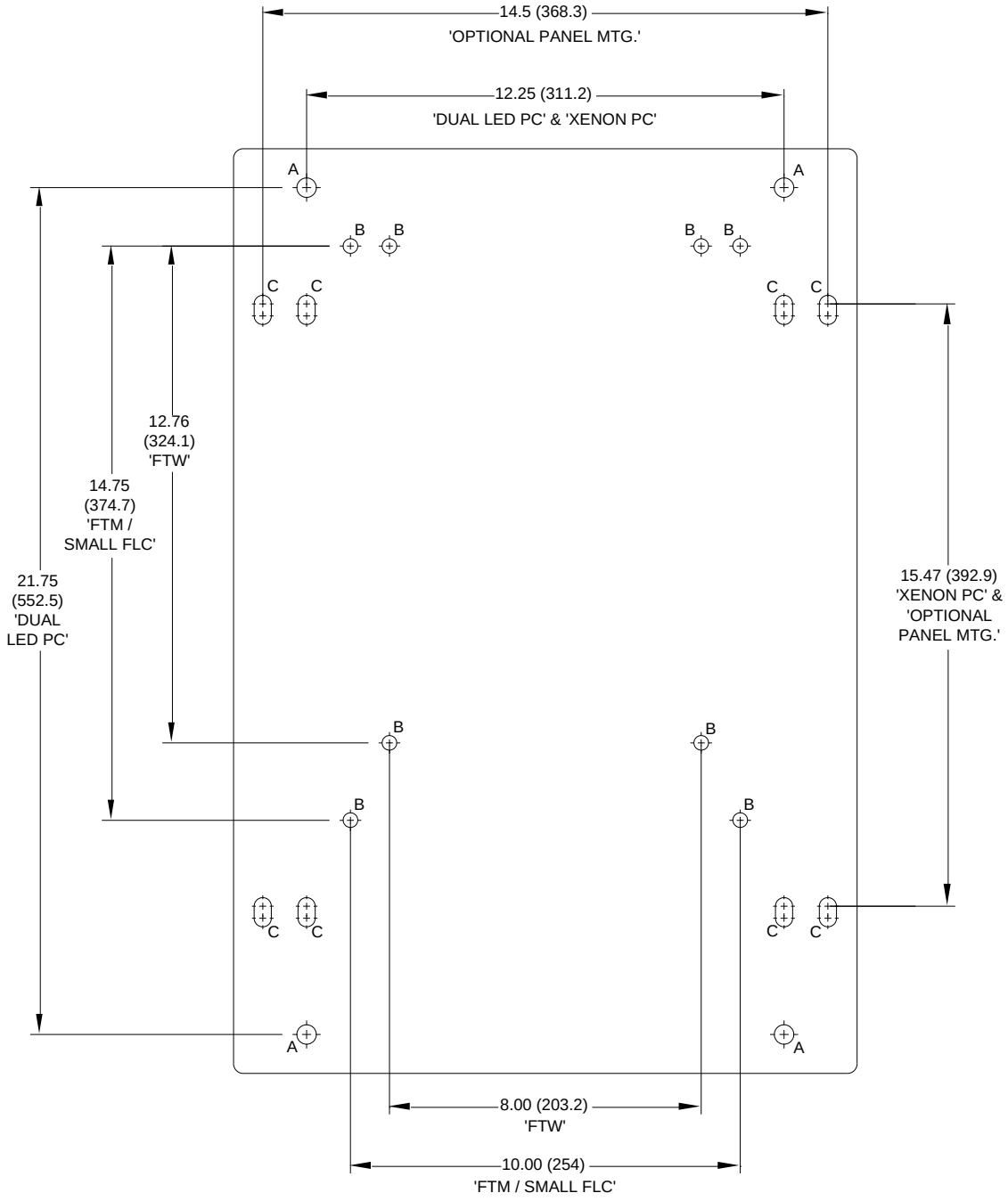
Note: All dimensions are in inches (millimeters).

Figure 2-9 – SC 372 / PC 372 Mounting and Outline (Painted Aluminum Option)



Note: All dimensions are in inches (millimeters).

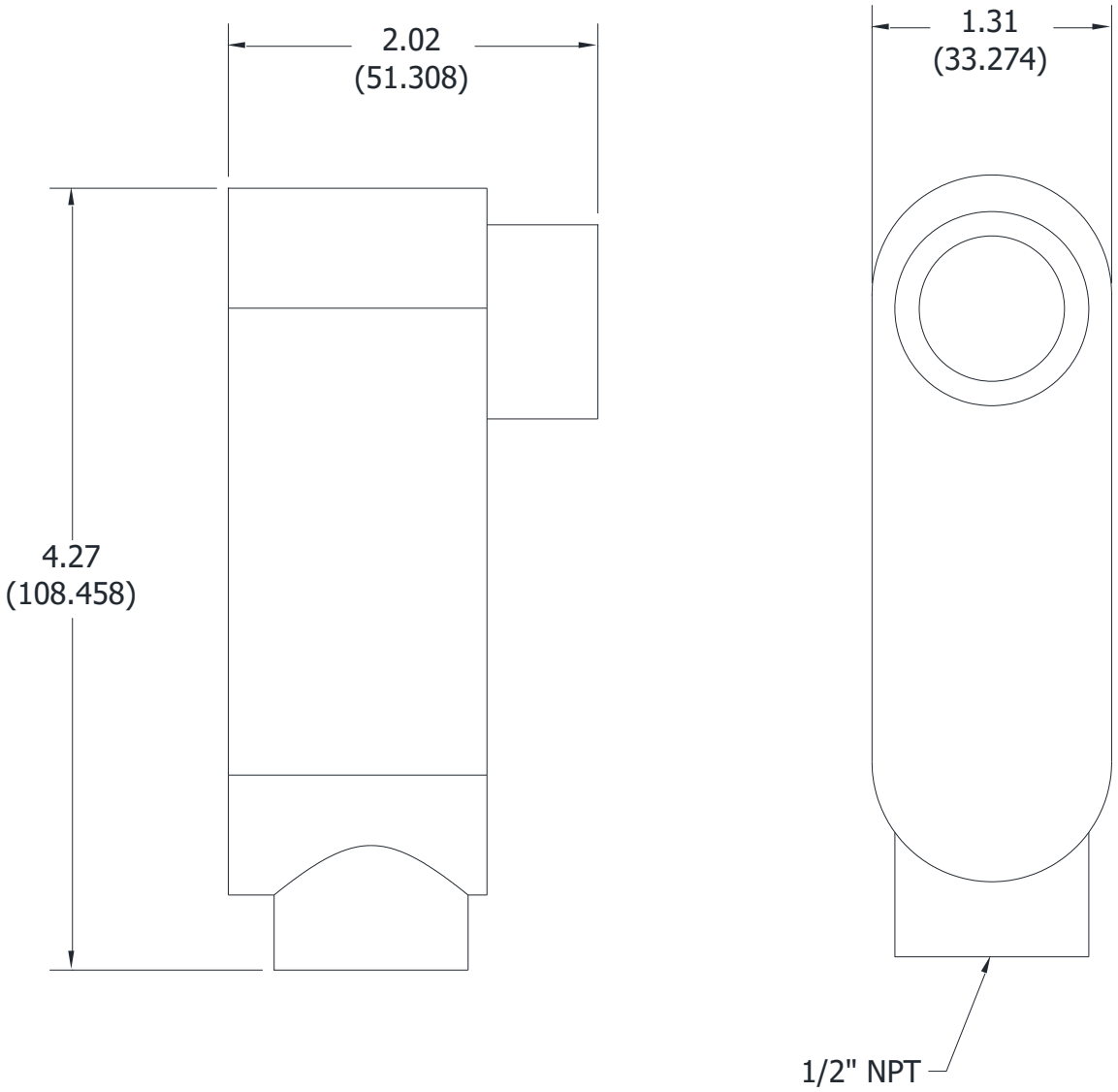
Figure 2-10 – SC 372/PC 372 Mounting and Outline (Stainless Steel Option)



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

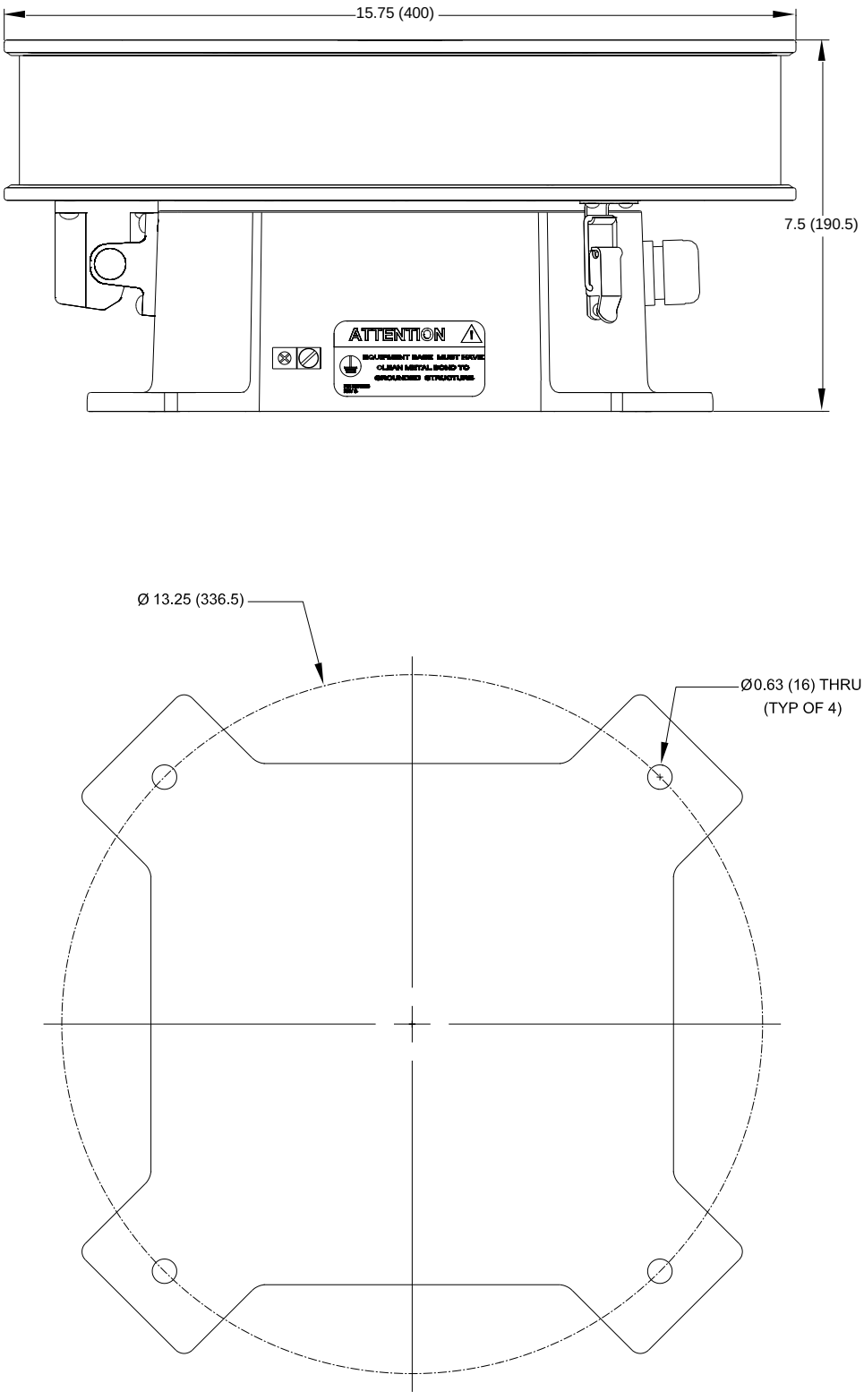
Note: All dimensions are in inches (millimeters).

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



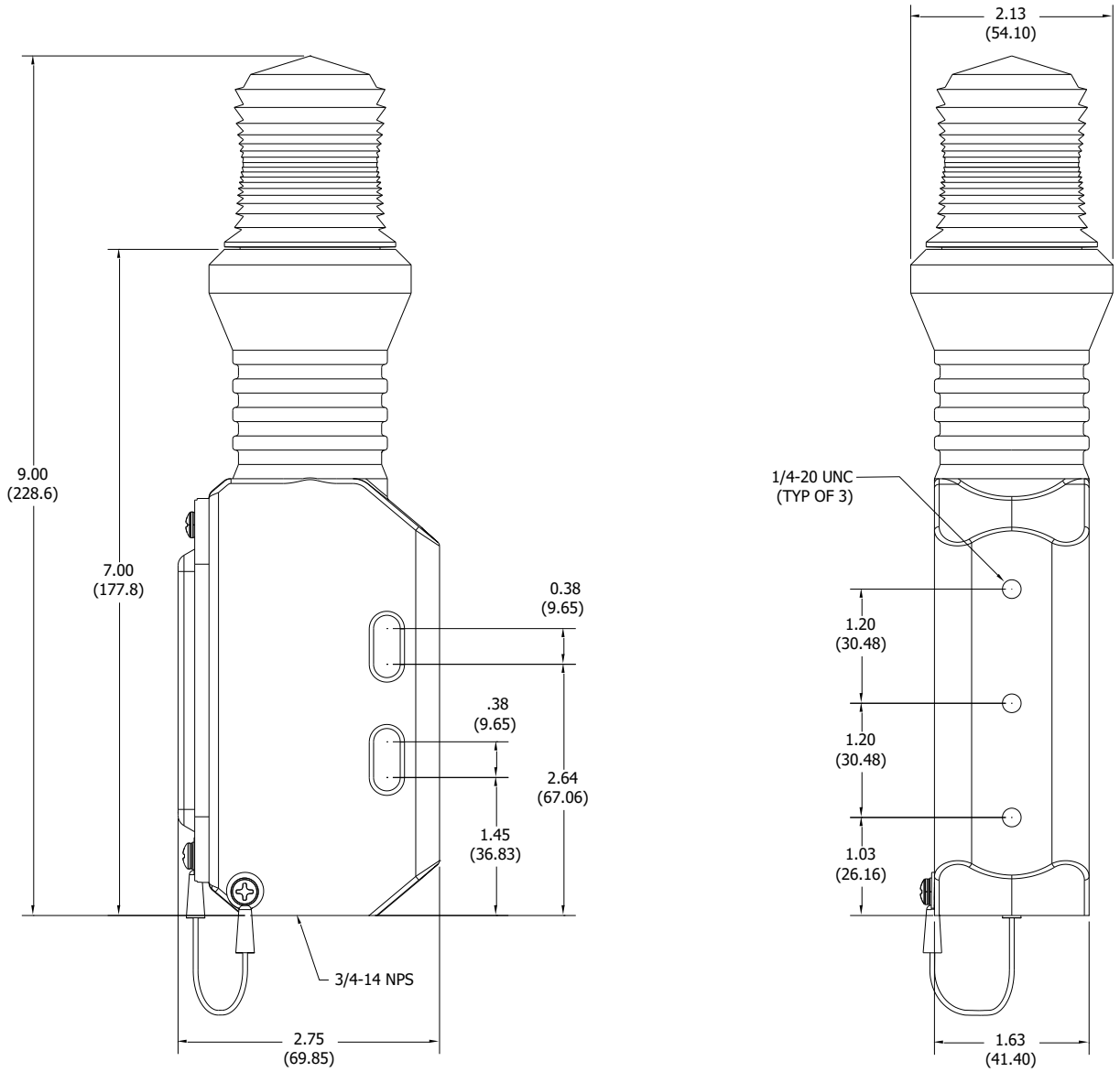
Note: All dimensions are in inches (millimeters).

Figure 2-12 – Photodiode Mounting and Outline



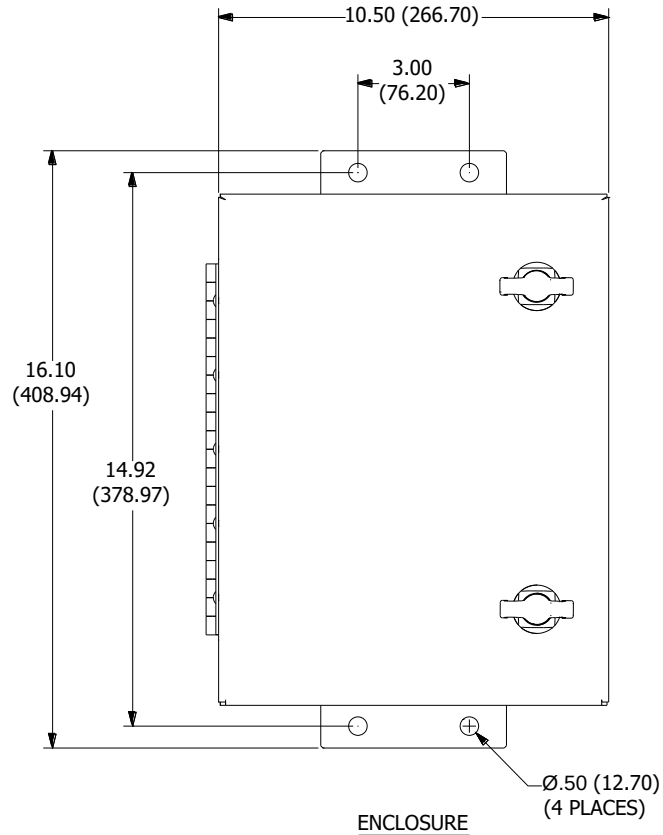
Note: All dimensions are in inches (millimeters).

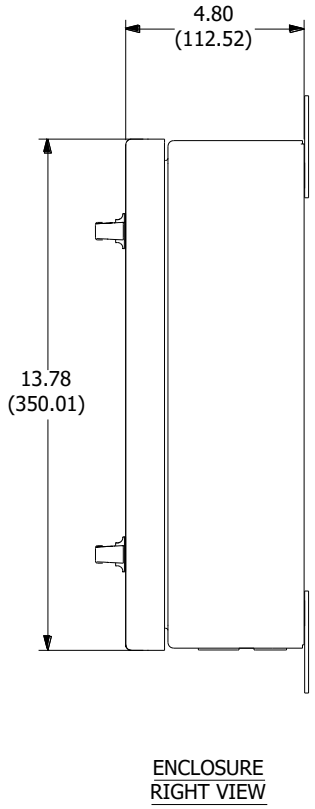
Figure 2-13 – Flashhead Dimensions and Mounting Outline

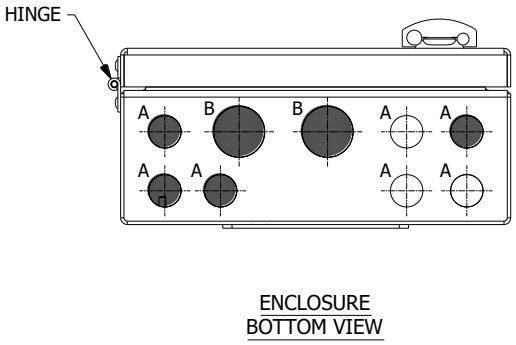


Note: All dimensions are in inches (millimeters).

Figure 2-14 – MKR 372 Mounting and Outline



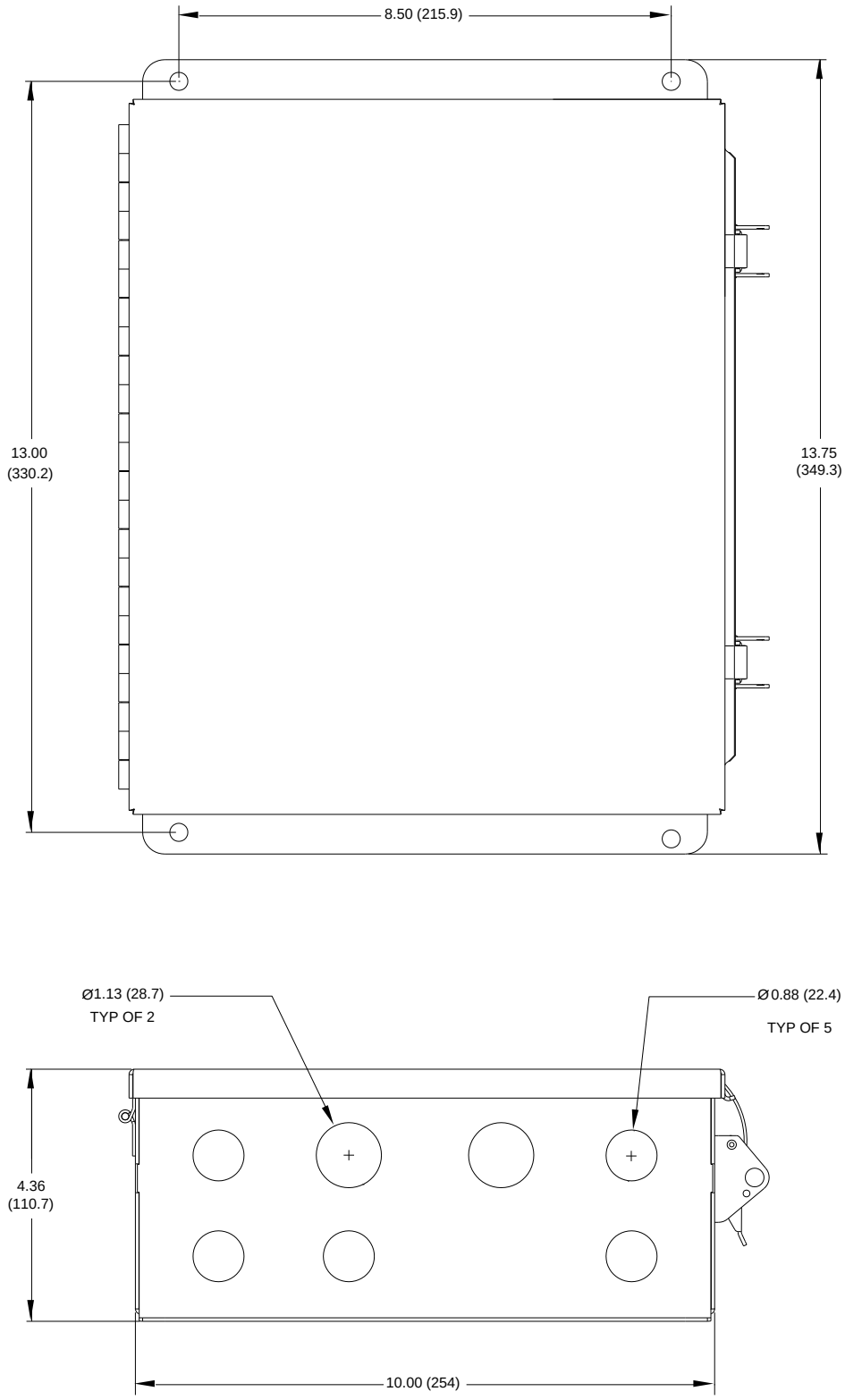




KNOCKOUT TABLE (ALL HOLES KNOCKOUT FROM INSIDE)		
LETTER	KNOCKOUT SIZE DIA	QTY
A	0.875 (22.4)	7
B	1.375 (34.9)	2
SHADED HOLES REPRESENT FACTORY REMOVED KNOCKOUTS		

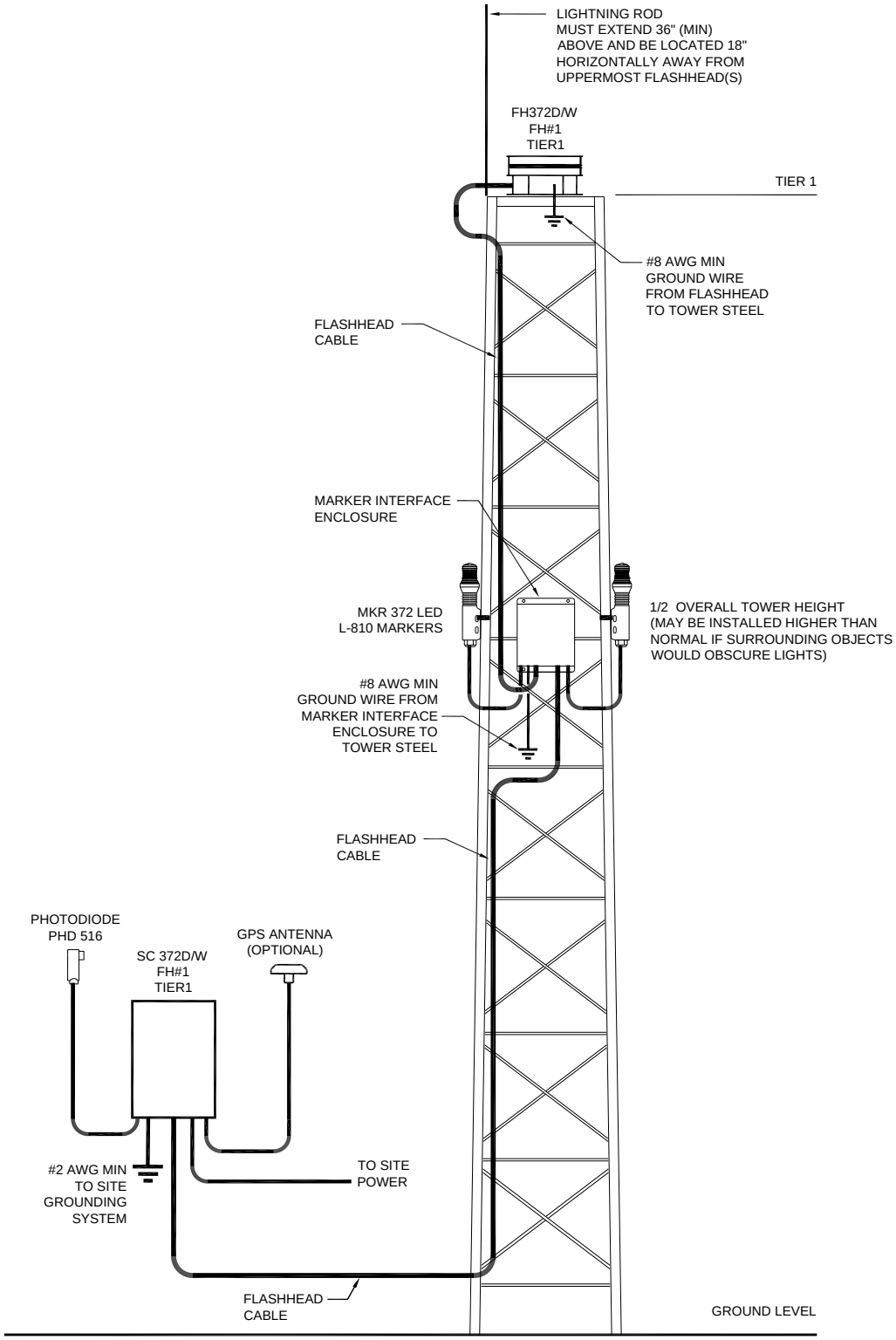
Note: All dimensions are in inches (millimeters).

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



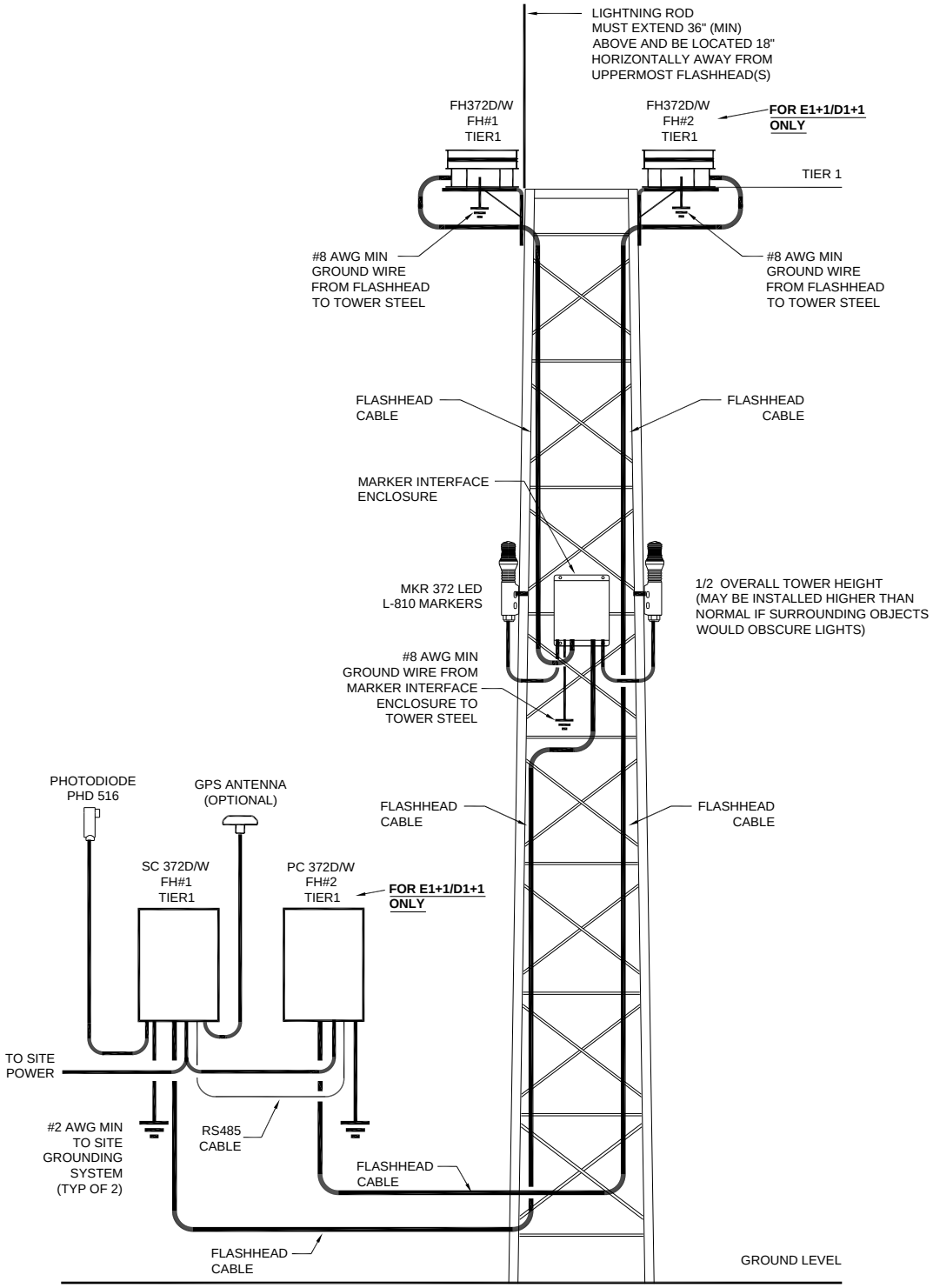
Note: All dimensions are in inches (millimeters).

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



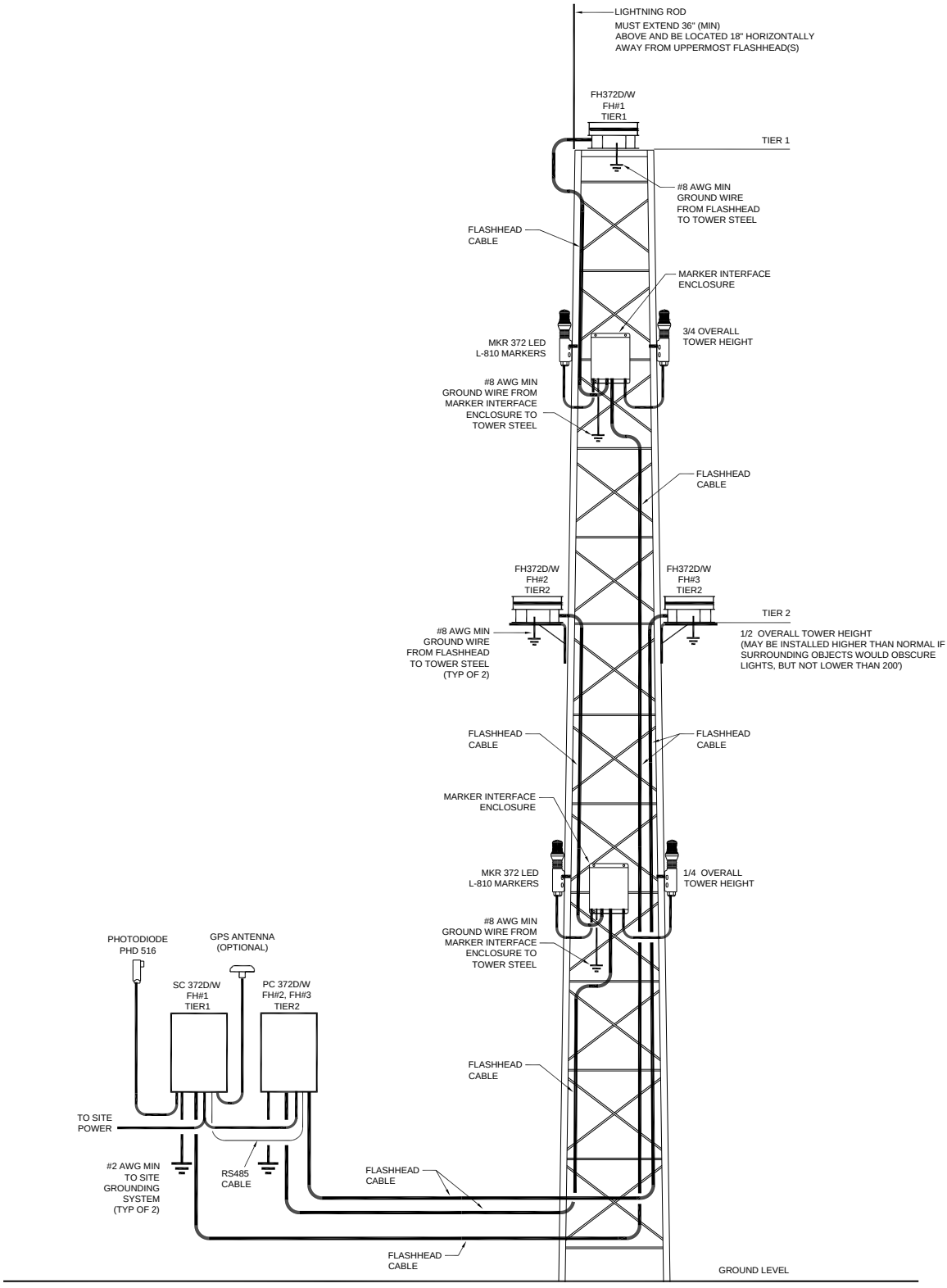
Note: Markers and Marker Interface Enclosure are omitted for D1 Installation.

Figure 2-17 – Typical E1/D1 Component Locations



Note: Markers and Marker Interface Enclosure are omitted for D1+1 Installation.

Figure 2-18 – Typical E1+1/D1+1 Component Locations



Note: Markers and Marker Interface Enclosure are omitted for D2 Installation.

Figure 2-19 – Typical E2 Component Locations

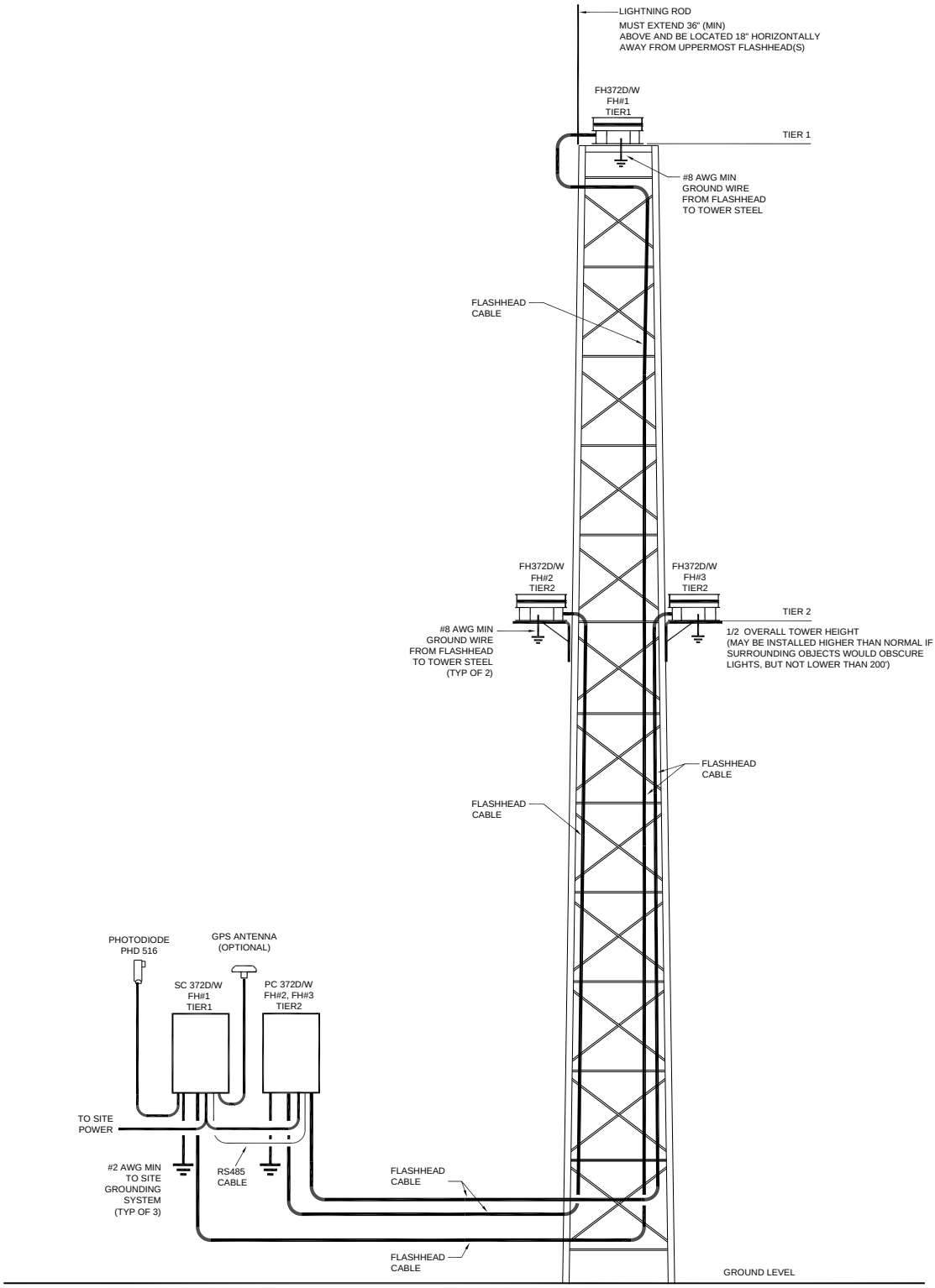


Figure 2-20 – Typical E2/D2 Avian Component Locations (AC 70/7460-1M)

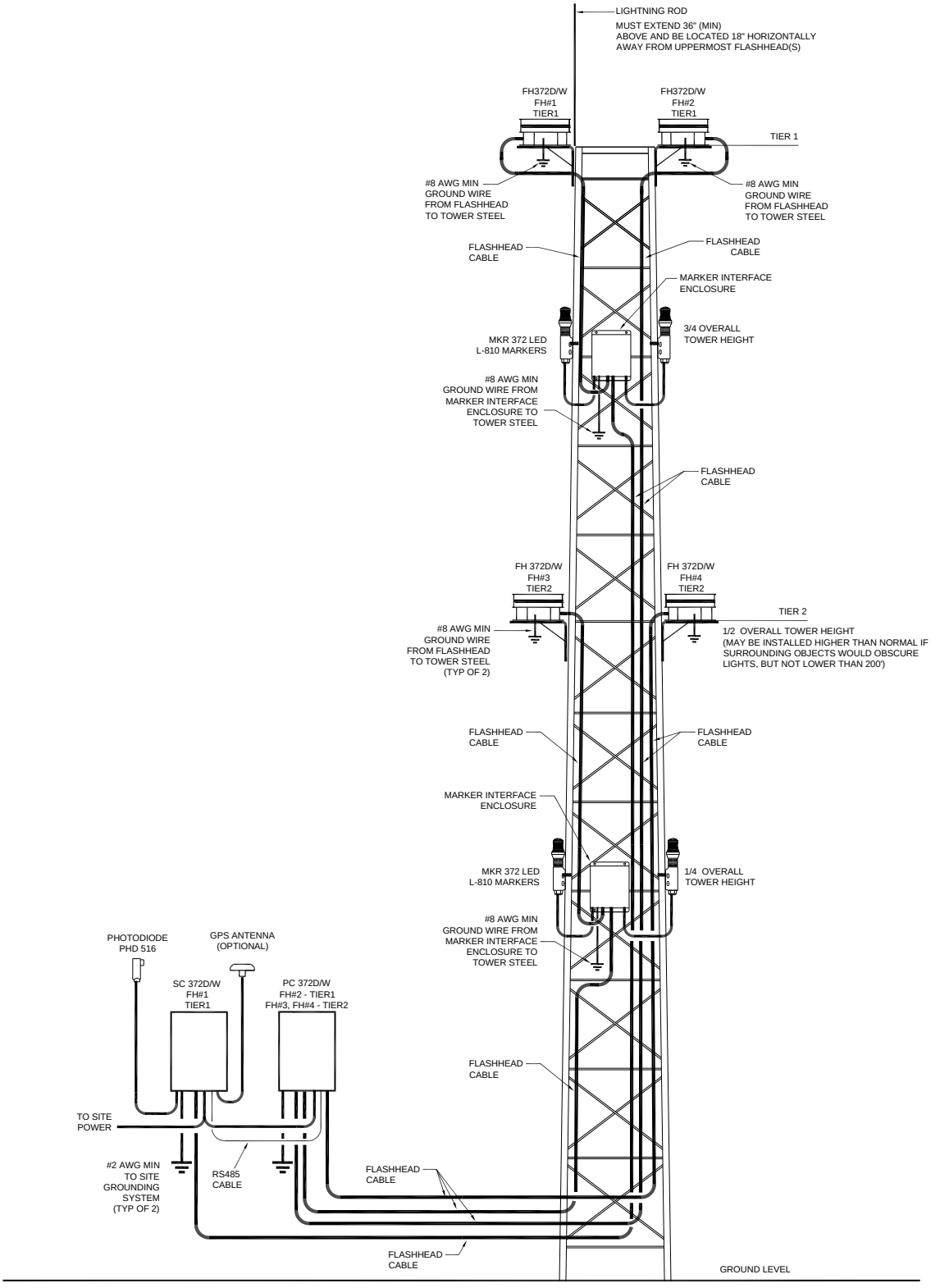


Figure 2-21 – Typical E2+1 Component Locations (AC 70/7460-1M)

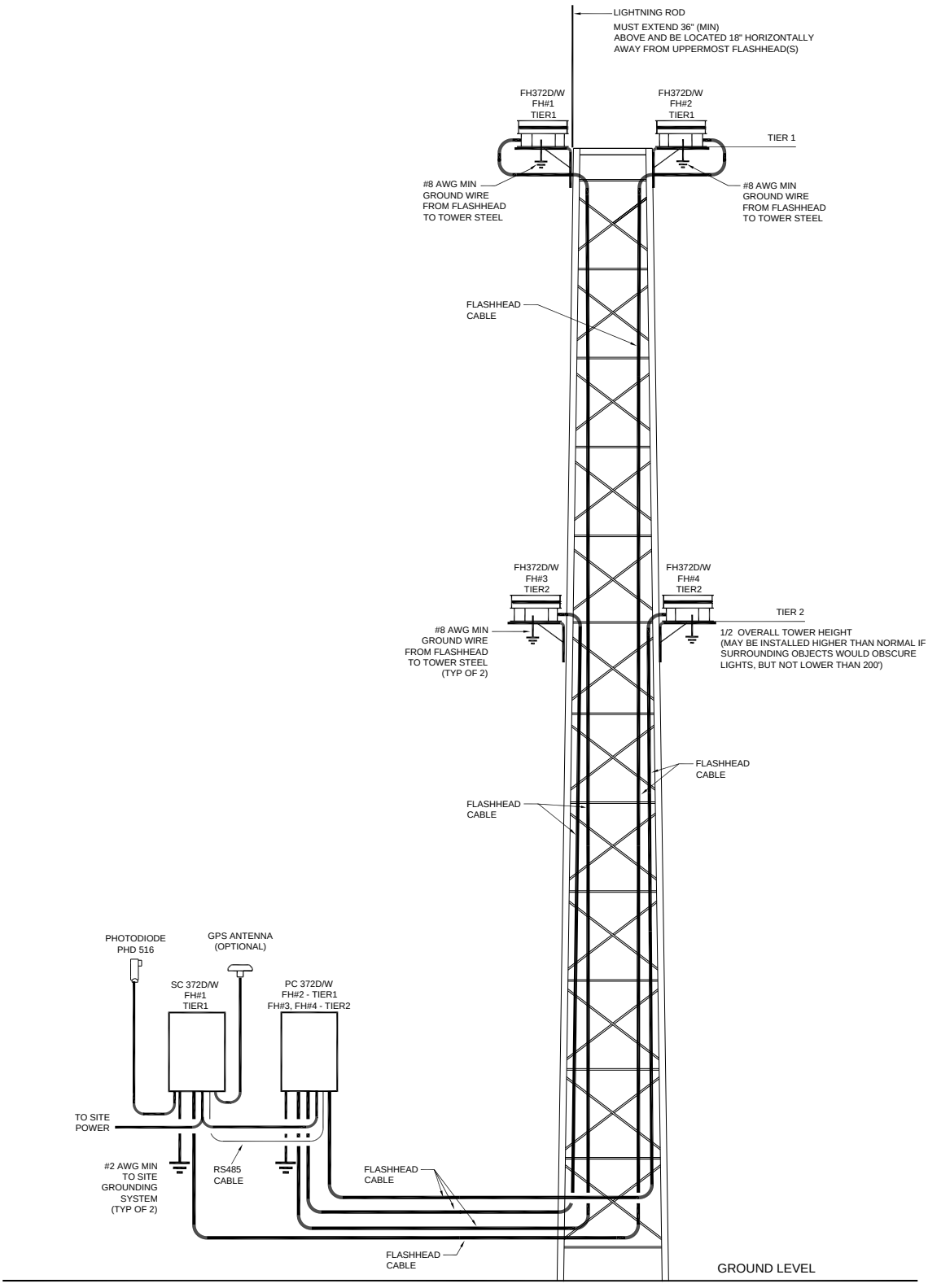


Figure 2-22 – Typical E2+1 / D2+1 Avian Component Locations (AC 70/7460-1M)

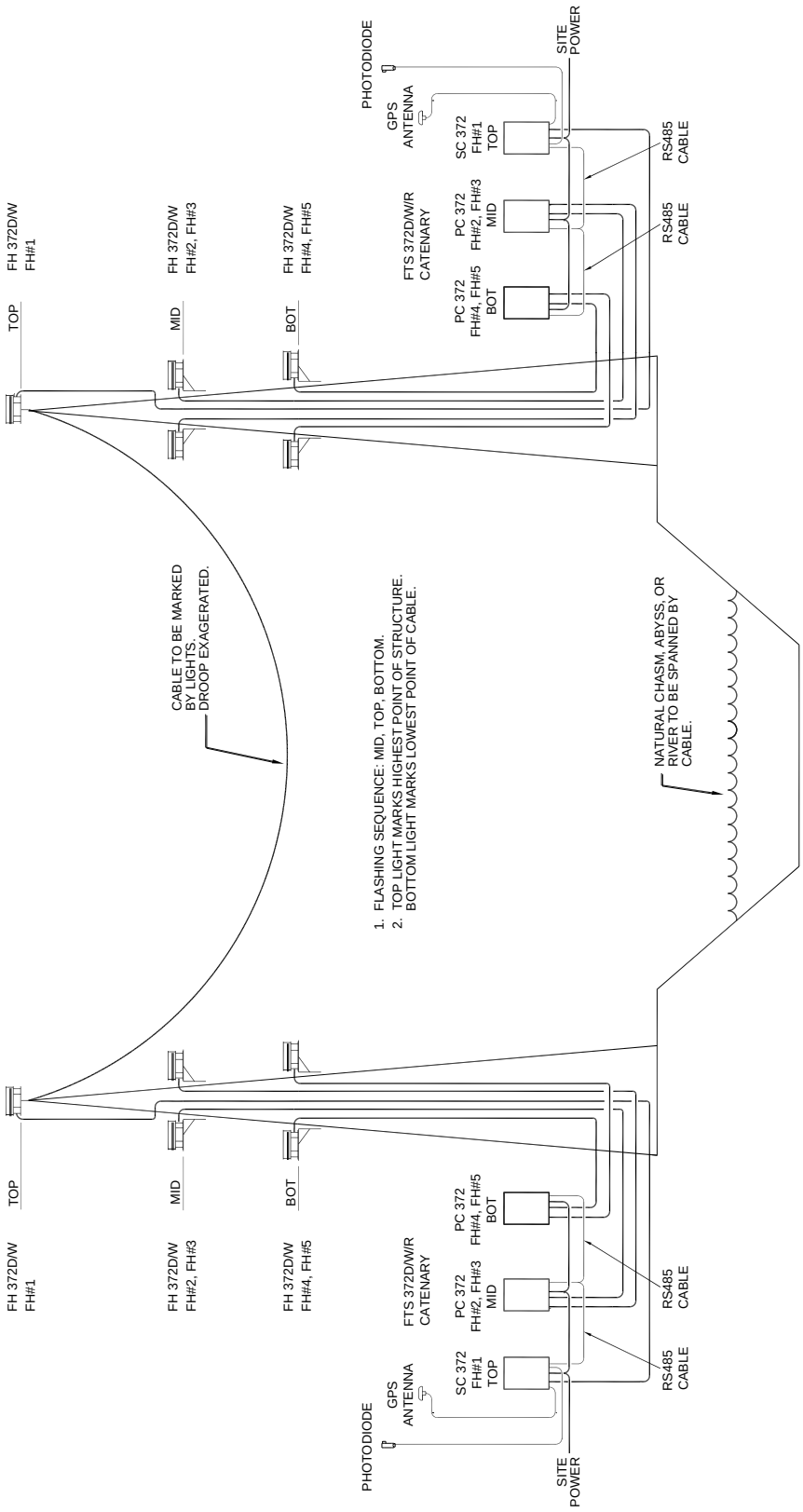


Figure 2-23 – Typical Catenary Component Locations (Showing 5 Flashhead Configuration)

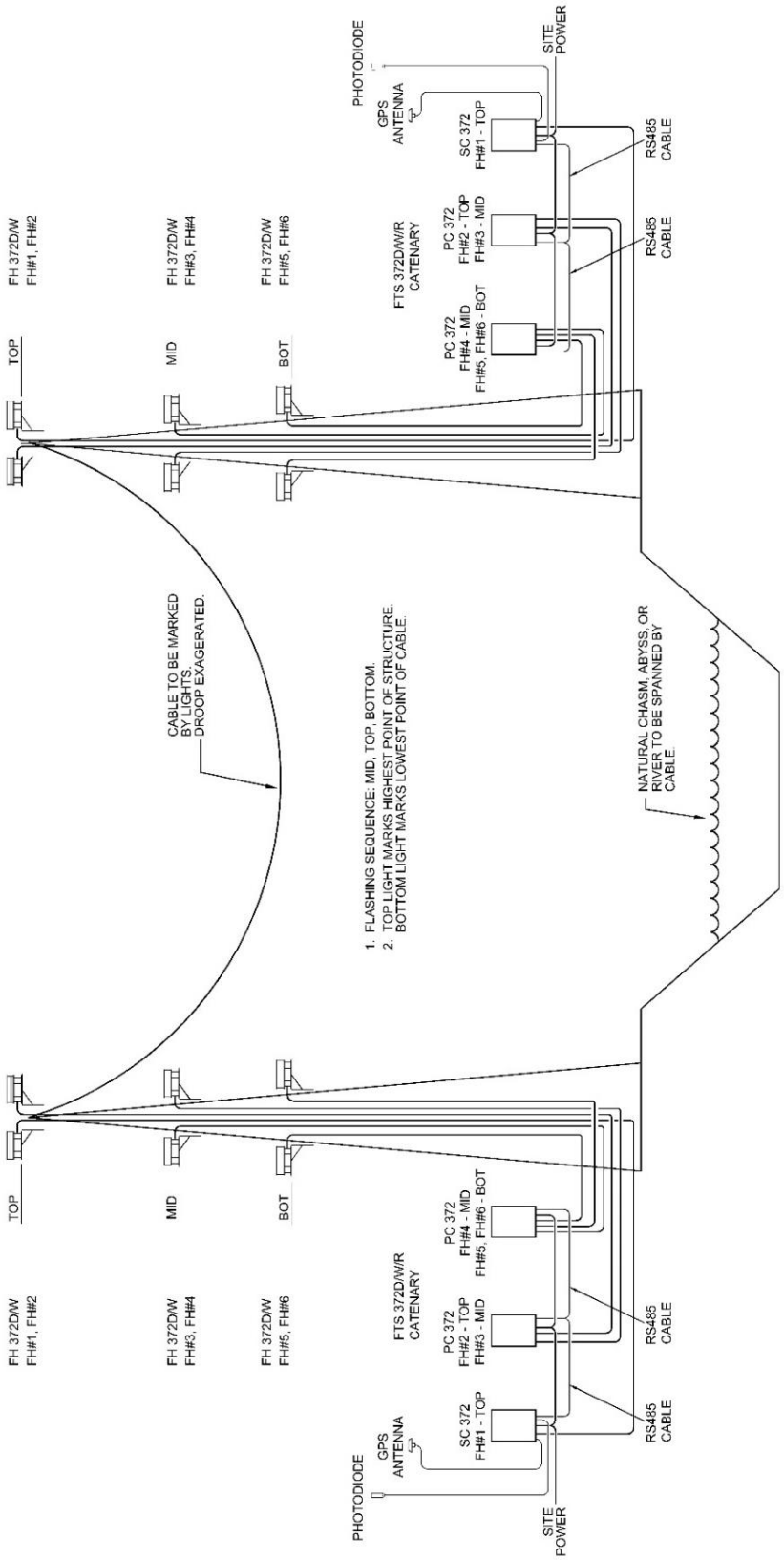


Figure 2-24 – Typical Catenary Component Locations (Showing 6 Flashhead Configuration)

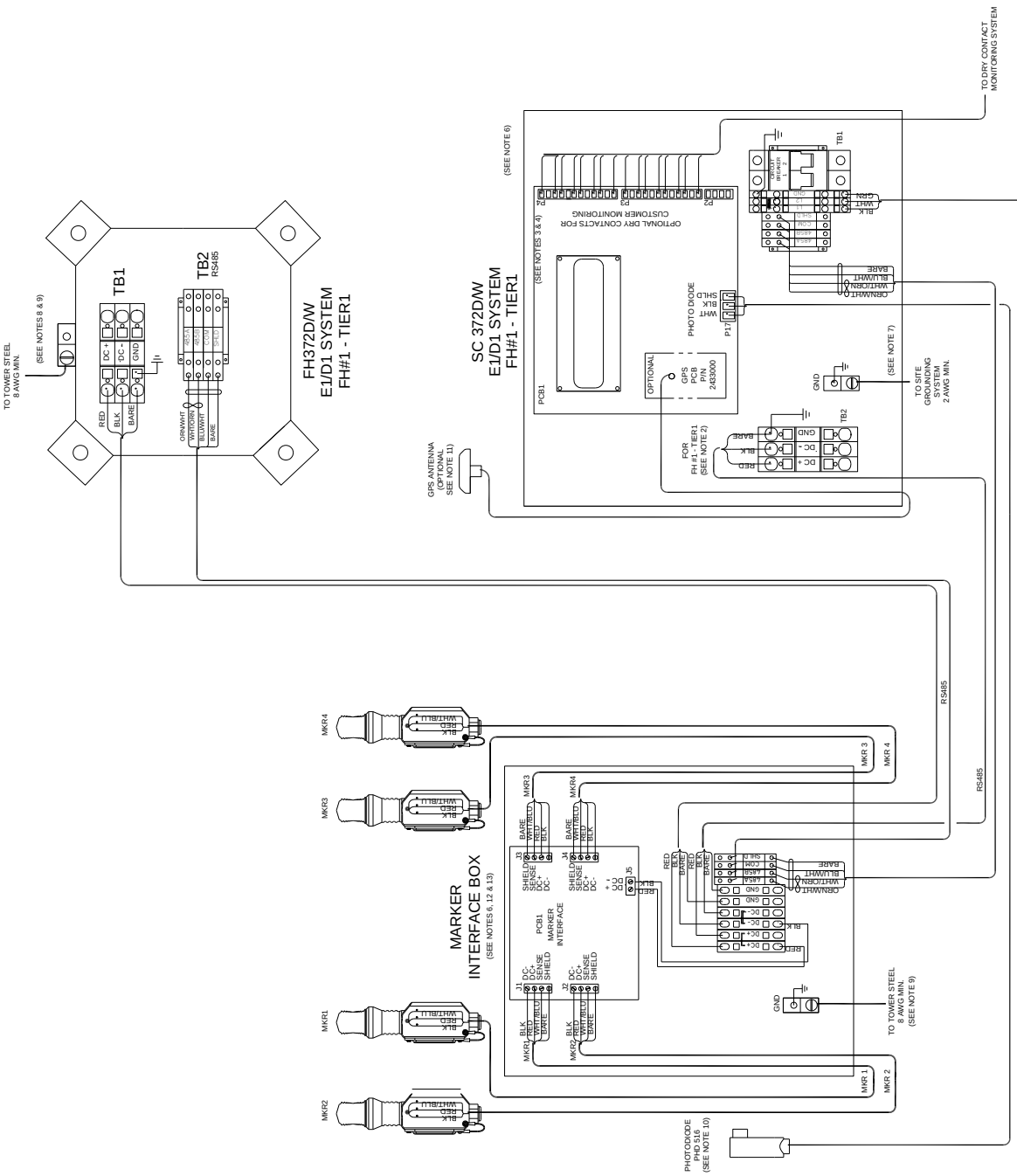


Figure 2-25 – Typical E1 & D1 System Wiring Diagram

SYSTEM WIRING DIAGRAM NOTES (E1 & D1)

1. Input power conductor size depends on the service voltage, the distance from the source, and number of SC 372 units connected. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372. Splicing of the cable is permissible only at the marker interface box for E1 systems and is not permissible for D1 systems. Place a 5' 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 (page 38).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 system.
6. Mount the enclosures vertically.
7. The SC 372 enclosure must be grounded to the site grounding system using 2 AWG wire minimum.
8. Install one or more lightning rods near the uppermost flashhead(s). The copper lightning rod(s) should extend a minimum of 36" above the height of the flashhead and a minimum of 18" horizontally away from the flashhead.
9. The FH 372 and Marker Box 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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna
12. Voltage drop to the L-810 markers must not exceed 3% of the rated voltage.
13. Mount the Marker Interface Enclosure at the marker tier level. A pictorial detailing the mounting of the Marker Interface Enclosure is included with the Marker Kit installation instructions (PN 7904208). Refer to "Vanguard® Marker Installation" (PN 7904214) for specific information regarding cable connection to the MKR 372

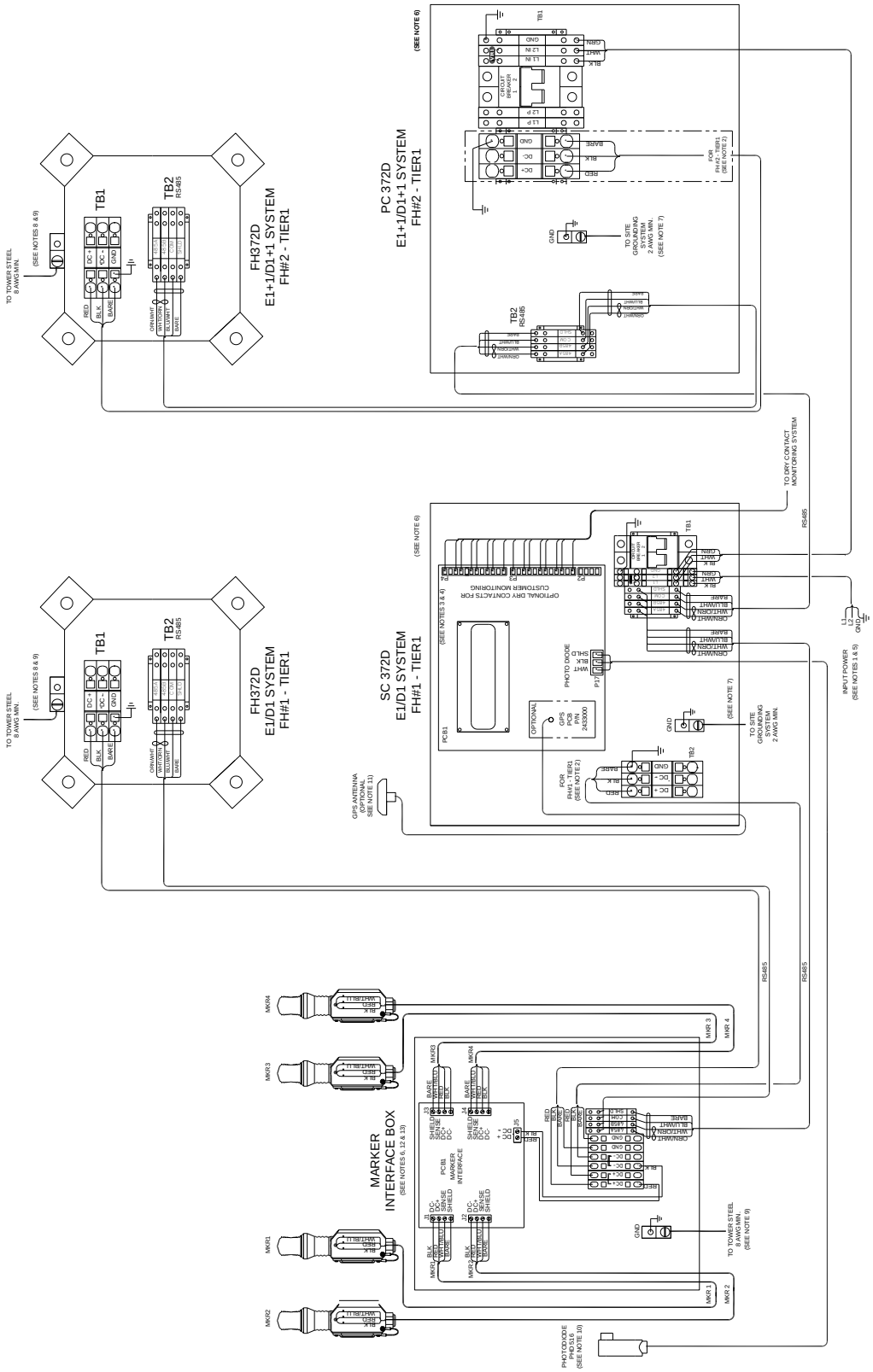


Figure 2-26 – Typical E1+1 & D1+1 System Wiring Diagram

SYSTEM WIRING DIAGRAM NOTES (E1+1 & D1+1)

1. Input power conductor size depends on the service voltage, the distance from the source, the number of SC 372 and PC 372 units connected and number of L-810 marker lights served. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372 or PC 372. Splicing of the cable is permissible only at the marker interface box (if installed). A 5' service loop should be placed at the base of the tower near the controller, just below the flashhead and above and below the marker interface box (if installed). The cable should be secured to the structure using the 2/3/4 method. See Securing the Cable (page 38).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 and PC 372 systems.
   Note: Do not use the Circuit Breaker terminals of TB1 to supply power to the PC 372.
6. Mount the enclosures vertically.
7. The SC 372 and PC 372 enclosures must be grounded to the site grounding system using 2 AWG wire minimum.
8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36" above the height of the flashhead and a minimum of 18" horizontally away from the flashhead.
9. The FH 372(s) and Marker Interface Box 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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna.
12. Voltage drop to the L-810 markers must not exceed 3% of the rated voltage.
13. Mount the Marker Interface Enclosure at the marker tier level. A pictorial detailing the mounting of the Marker Interface Enclosure is included with the Marker Kit installation instructions (PN 7904208). Refer to "Vanguard® Marker Installation" (PN 7904214) for specific information regarding cable connection to the MKR 372

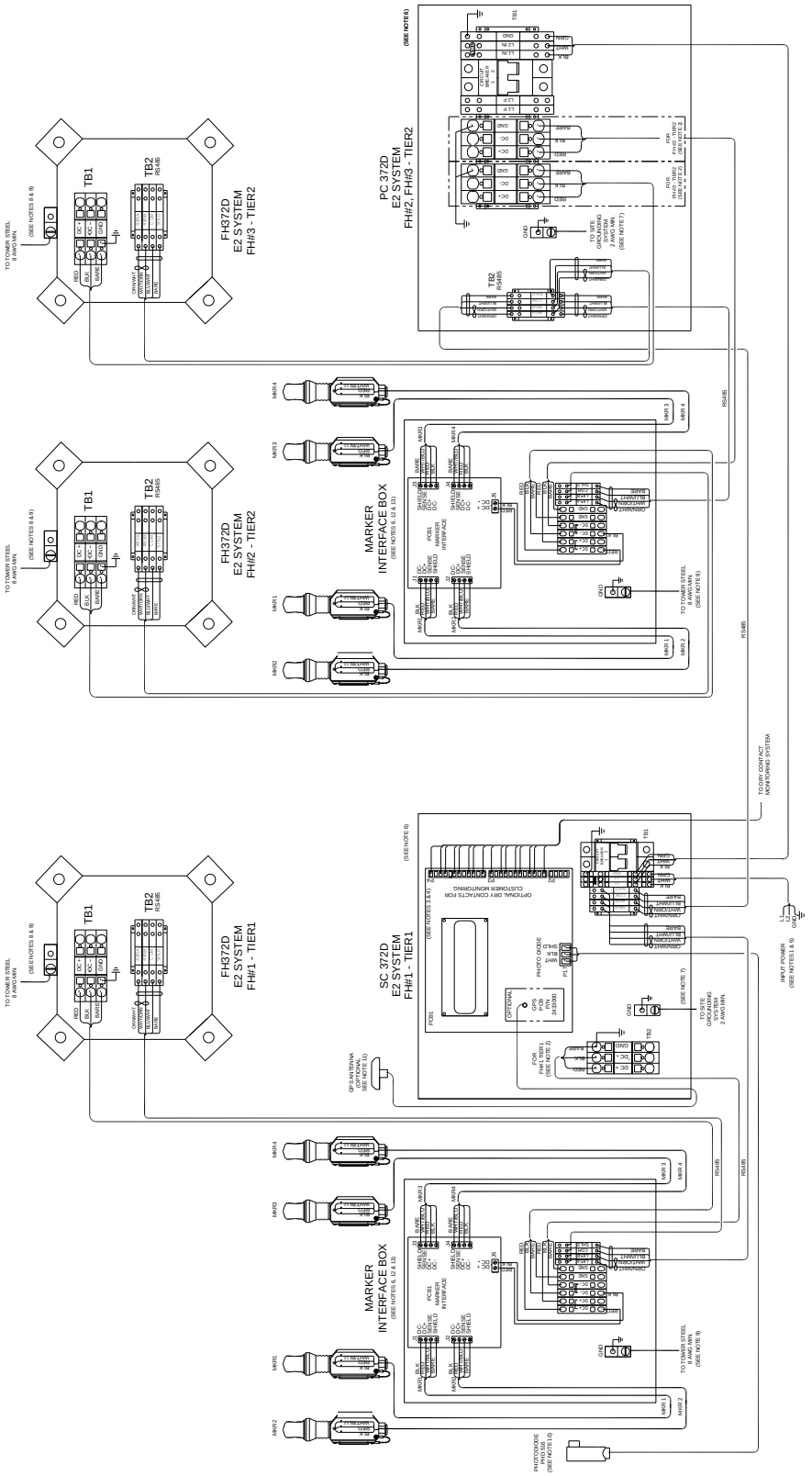


Figure 2-27 – Typical E2 System Wiring Diagram

SYSTEM WIRING DIAGRAM NOTES (E2)

1. Input power conductor size depends on the service voltage, the distance from the source, the number of SC 372 and PC 372 units connected and number of L-810 marker lights served. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372 or PC 372. Splicing of the cable is permissible only at the marker interface box (if installed). A 5’ service loop should be placed at the base of the tower near the controller, just below the flashhead and above and below the marker interface box (if installed). The cable should be secured to the structure using the 2/3/4 method. See Securing the Cable (page 38).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 and PC 372 systems.
   Note: Do not use the Circuit Breaker terminals of TB1 to supply power to the PC 372.
6. Mount the enclosures vertically.
7. The SC 372 and PC 372 enclosure must be grounded to the site grounding system using 2 AWG wire minimum.
8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36” above the height of the flashhead and a minimum of 18” horizontally away from the flashhead.
9. The FH 372(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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna.
12. Voltage drop to the L-810 markers must not exceed 3% of the rated voltage.
13. Mount the Marker Interface Enclosure at the marker tier level. A pictorial detailing the mounting of the Marker Interface Enclosure is included with the Marker Kit installation instructions (PN 7904208). Refer to “Vanguard® Marker Installation” (PN 7904214) for specific information regarding cable connection to the MKR 372

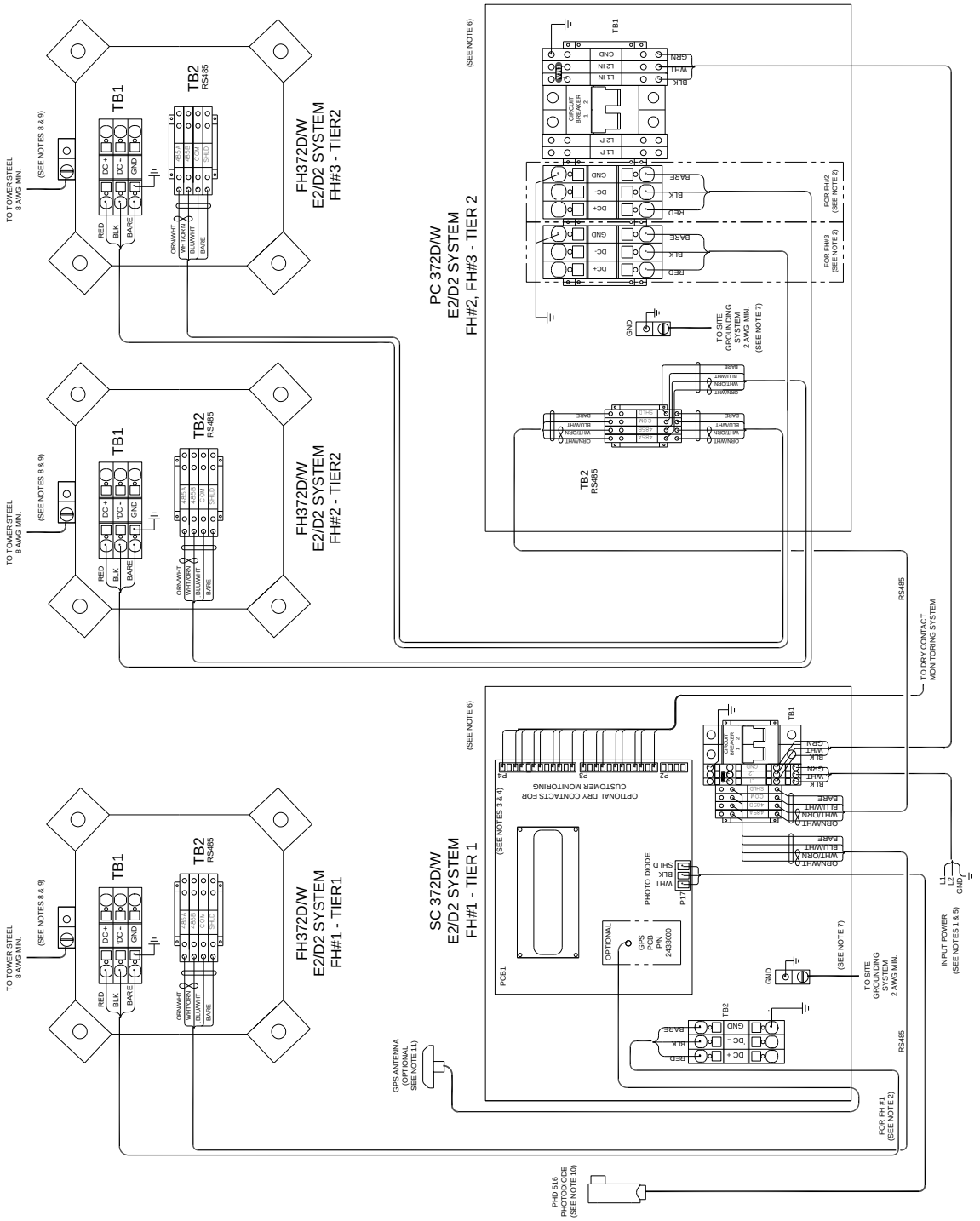


Figure 2-28 – Typical E2 Avian and D2 System Wiring Diagram

SYSTEM WIRING DIAGRAM NOTES (E2 AVIAN & D2)

1. Input power conductor size depends on the service voltage, the distance from the source, and the number of SC 372 and PC 372 connected. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372 or PC 372. Splicing of the cable is not permitted. A 5’ service loop should be placed at the base of the tower near the controller and just below the flashhead. The cable should be secured to the structure using the 2/3/4 method. See Securing the Cable (page 38).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 and PC 372 systems.
   Note: Do not use the Circuit Breaker terminals of TB1 to supply power to the PC 372.
6. Mount the enclosures vertically.
7. The SC 372 and PC 372 enclosures must be grounded to the site grounding system using 2 AWG wire minimum.
8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36” above the height of the flashhead and a minimum of 18” horizontally away from the flashhead.
9. The FH 372(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. 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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna.

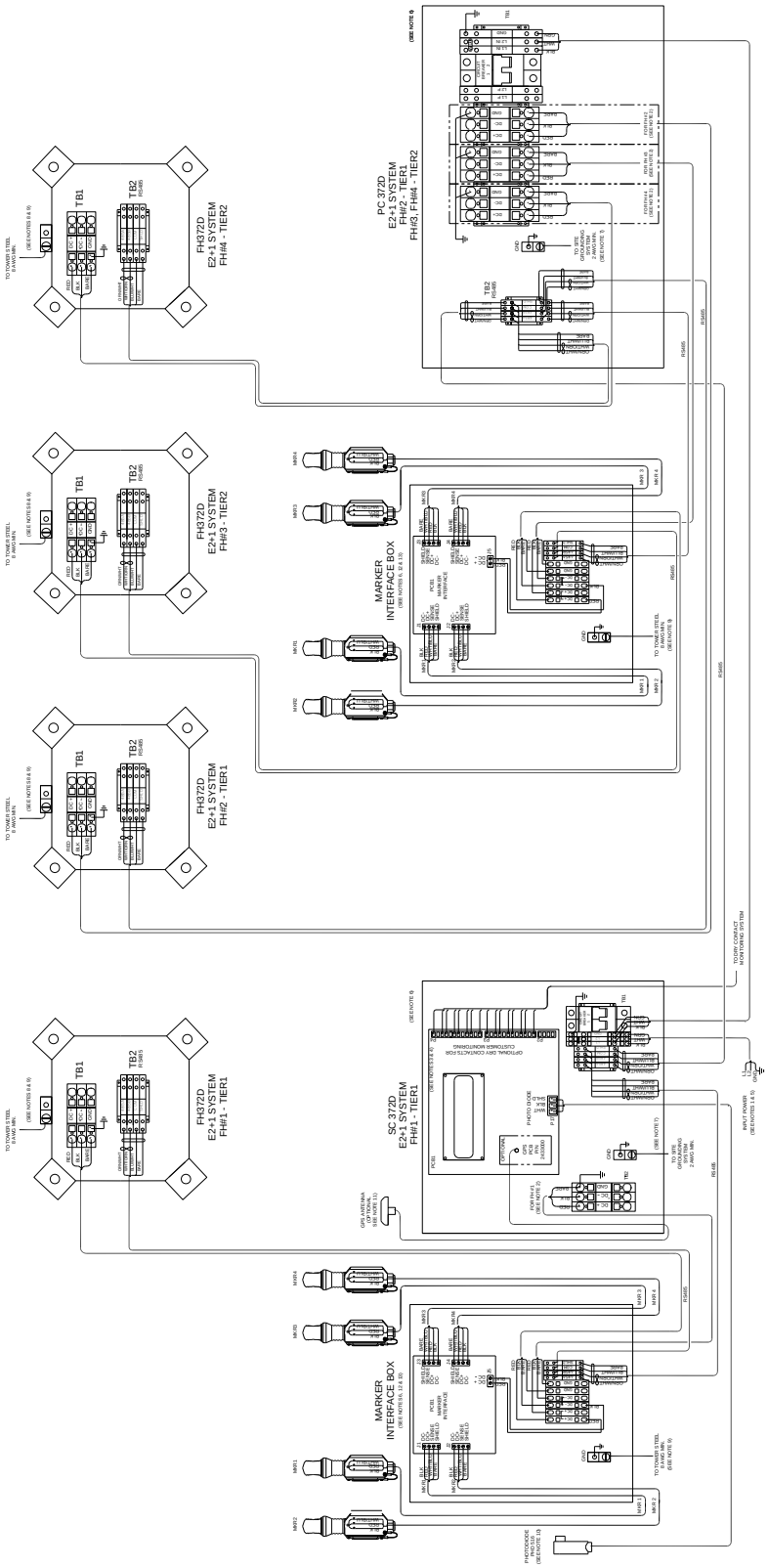


Figure 2-29 – Typical E2+1 System Wiring Diagram

SYSTEM WIRING DIAGRAM NOTES (E2+1)

1. Input power conductor size depends on the service voltage, the distance from the source, the number of SC 372 and PC 372 units connected and number of L-810 marker lights served. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372 or PC 372. Splicing of the cable is permissible only at the marker interface box (if installed). A 5’ service loop should be placed at the base of the tower near the controller, just below the flashhead and above and below the marker interface box (if installed). The cable should be secured to the structure using the 2/3/4 method. See Securing the Cable (page 38).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 and PC 372 systems.
   Note: Do not use the Circuit Breaker terminals of TB1 to supply power to the PC 372.
6. Mount the enclosures vertically.
7. The SC 372 and PC 372 enclosures must be grounded to the site grounding system using 2 AWG wire minimum.
8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36” above the height of the flashhead and a minimum of 18” horizontally away from the flashhead.
9. The FH 372(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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna.
12. Voltage drop to the L-810 markers must not exceed 3% of the rated voltage.
13. Mount the Marker Interface Enclosure at the marker tier level. A pictorial detailing the mounting of the Marker Interface Enclosure is included with the Marker Kit installation instructions (PN 7904208). Refer to “Vanguard® Marker Installation” (PN 7904214) for specific information regarding cable connection to the MKR 372

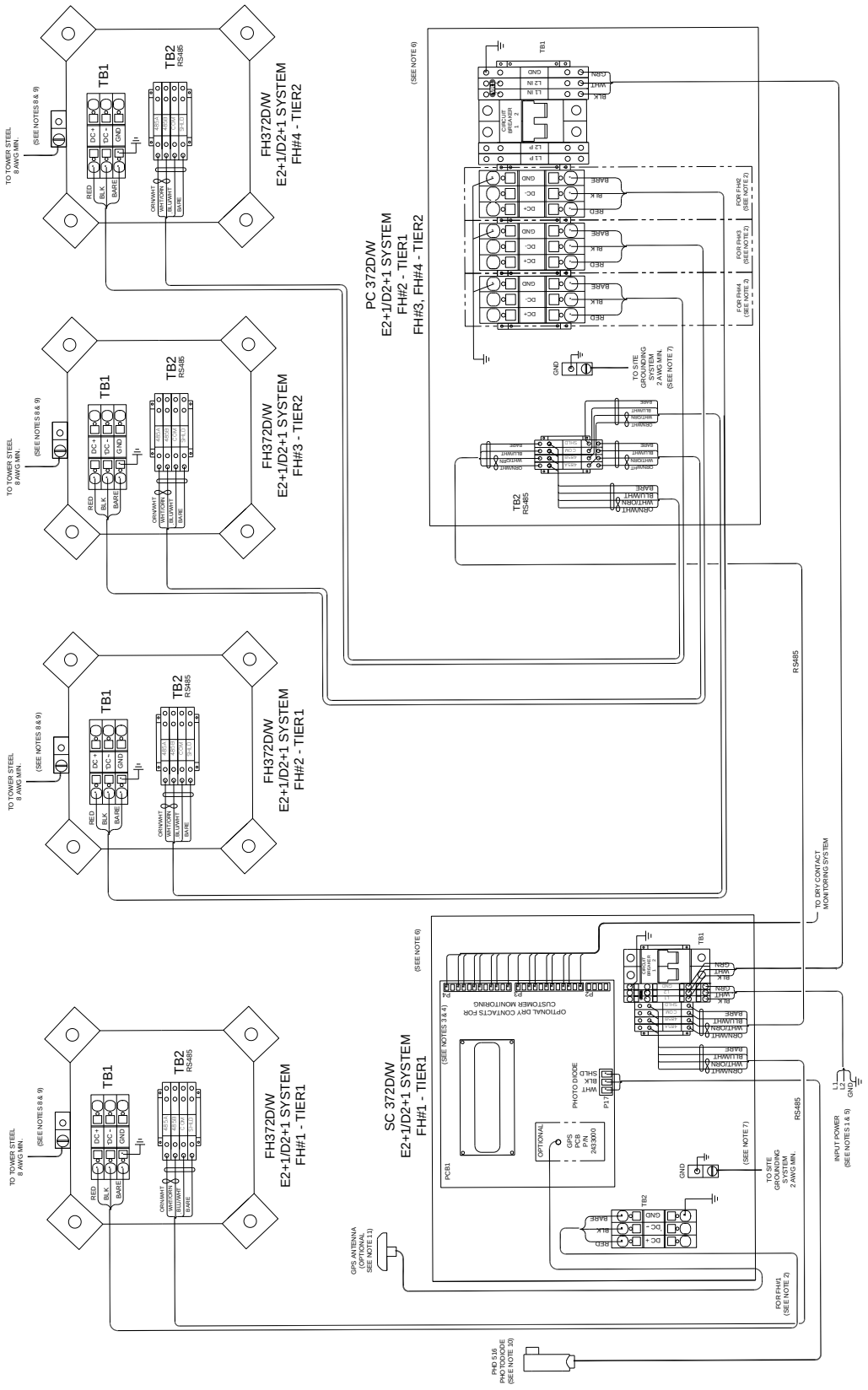


Figure 2-30 – Typical E2+1 and D2+1 Avian System Wiring Diagram

SYSTEM WIRING DIAGRAM NOTES (E2+1/D2+1 AVIAN)

1. Input power conductor size depends on the service voltage, the distance from the source, and the number of SC 372 and PC 372 units connected. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372 or PC 372. Splicing of the cable is not permitted. A 5’ service loop should be placed at the base of the tower near the controller, and just below the flashhead. The cable should be secured to the structure using the 2/3/4 method. See Securing the Cable (page 38).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 and PC 372 systems.
   Note: Do not use the Circuit Breaker terminals of TB1 to supply power the PC 372 units.
6. Mount the enclosures vertically.
7. The SC 372 and PC 372 enclosures must be grounded to the site grounding system using 2 AWG wire minimum.
8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36” above the height of the flashhead and a minimum of 18” horizontally away from the flashhead.
9. The FH 372(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. 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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna.

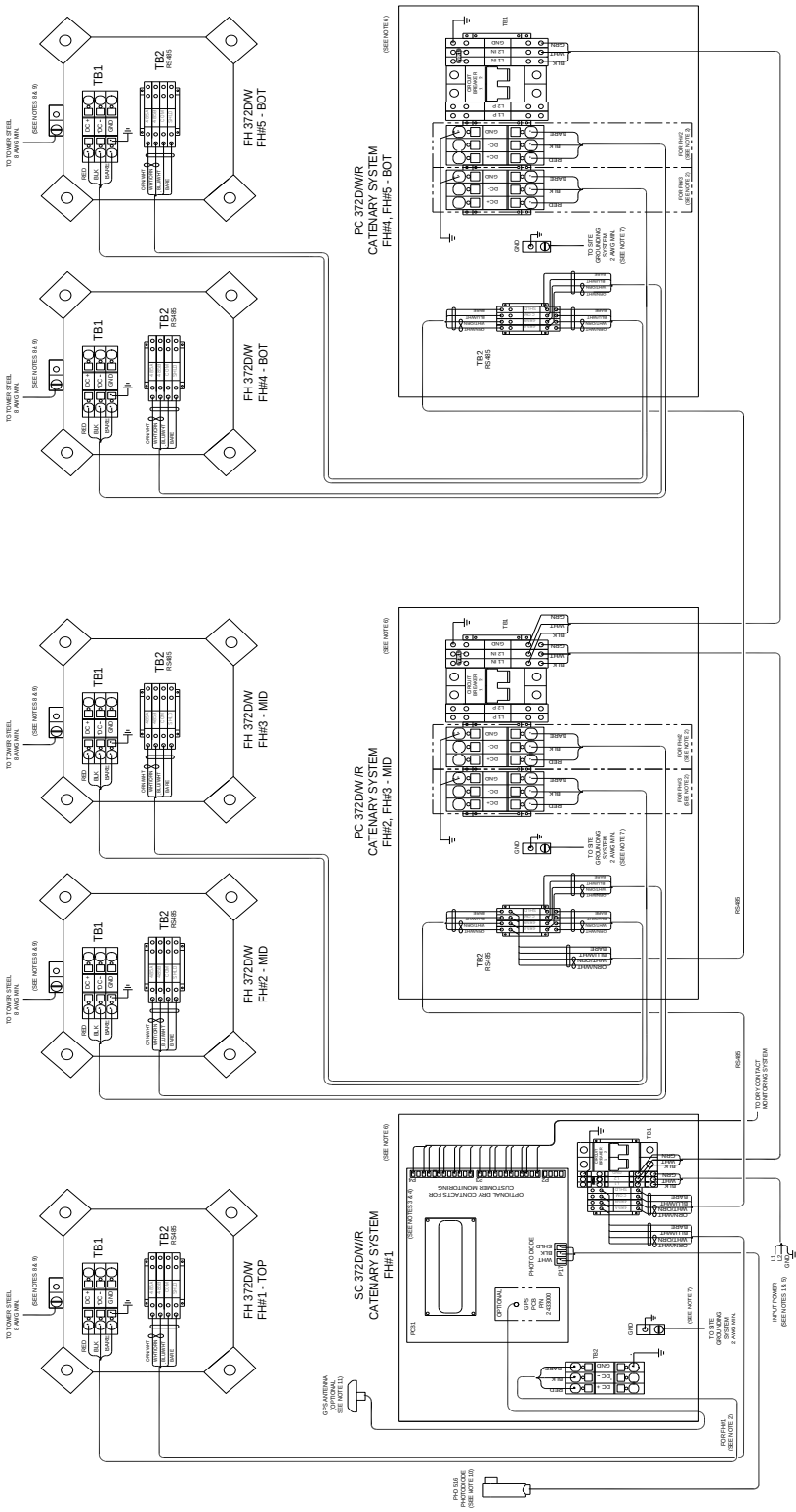


Figure 2-31 – Typical Catenary System Wiring Diagram (With 5 Lights)

SYSTEM WIRING DIAGRAM NOTES (CATENARY 5 LIGHTS)

1. Input power conductor size depends on the service voltage, the distance from the source, and number of SC 372 and PC 372 units connected. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372 and PC 372. Splicing of the cable is not permissible on Catenary systems. A 5' service loop should be placed at the base of the tower near the controller and just below the flashhead. The cable should be secured to the structure using the 2/3/4 method. See "Securing the Cable" (page 38).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 and PC 372 systems.
   Note: Do not use the Circuit Breaker terminals of TB1 to supply power to the PC 372 units.
6. Mount the enclosures vertically.
7. The SC 372 and PC 372 enclosures must be grounded to the site grounding system using 2 AWG wire minimum.
8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36" above the height of the flashhead and a minimum of 18" horizontally away from the flashhead.
9. The FH 372(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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna.

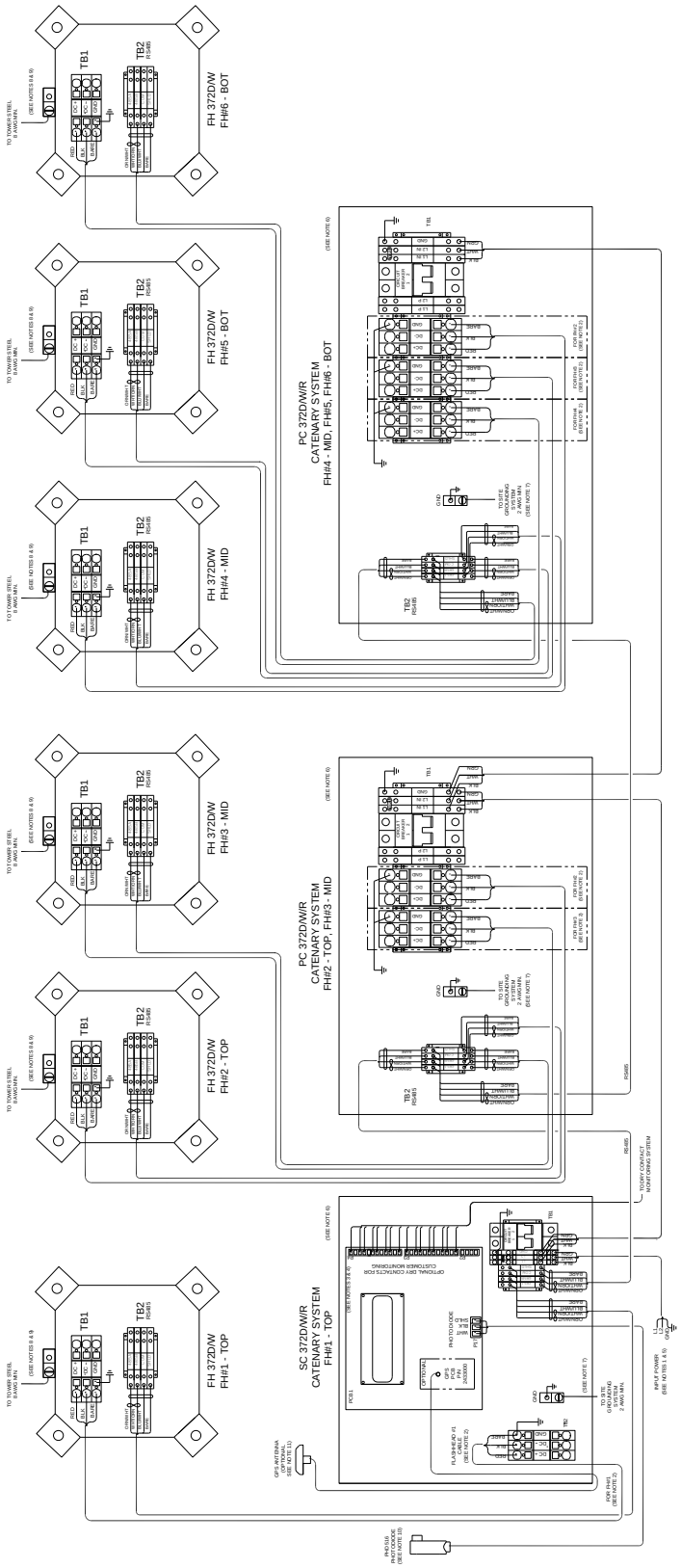


Figure 2-32 – Typical Catenary System Wiring Diagram (With 6 Lights)

SYSTEM WIRING DIAGRAM NOTES (CATENARY 6 LIGHTS)

1. Input power conductor size depends on the service voltage, the distance from the source, and number of SC 372 and PC 372 units connected. Assume 340 VA per SC 372. Also see Note 5.
2. Use only Flash Technology Cable PN 4372100, 4372080, or 4372060 to connect the flashhead to the SC 372. Splicing of the cable is not permissible on Catenary systems. A 5’ service loop should be placed at the base of the tower near the controller and just below the flashhead. The cable should be secured to the structure using the 2/3/4 method. See “Securing the Cable” (this section).
3. Dry contact alarm output contact rating 5 ampere, 250 VAC. Contacts shown in normal operating state with no alarms or errors.
4. User's alarm circuit not shown.
5. It is recommended that the input power is connected to L1 & L2 (AC units) or + & - (DC units) and Ground terminals of terminal block TB1 on the SC 372 and PC 372 systems.
   Note: Do not use the Circuit Breaker terminals of TB1 to supply power to the PC 372 units.
6. Mount the enclosures vertically.
7. The SC 372 enclosure must be grounded to the site grounding system using 2 AWG wire minimum.
8. **Install one or more lightning rods near the uppermost flashhead(s).** The copper lightning rod(s) should extend a minimum of 36” above the height of the flashhead and a minimum of 18” horizontally away from the flashhead.
9. The FH 372(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 1905355). While not recommended, 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 1905355) is recommended for installation of the GPS antenna.

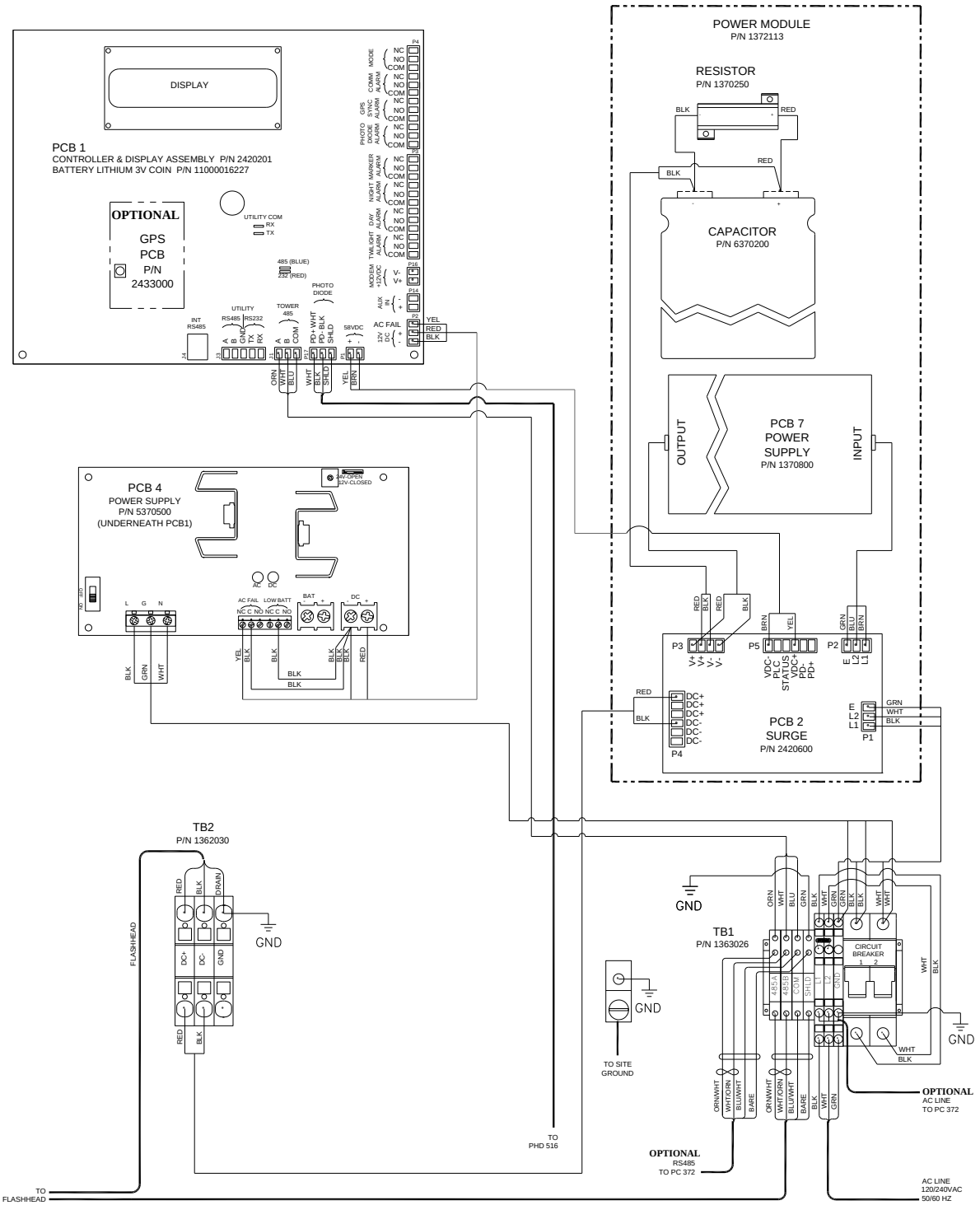


Figure 2-33 – SC 372 (AC) Internal Wiring

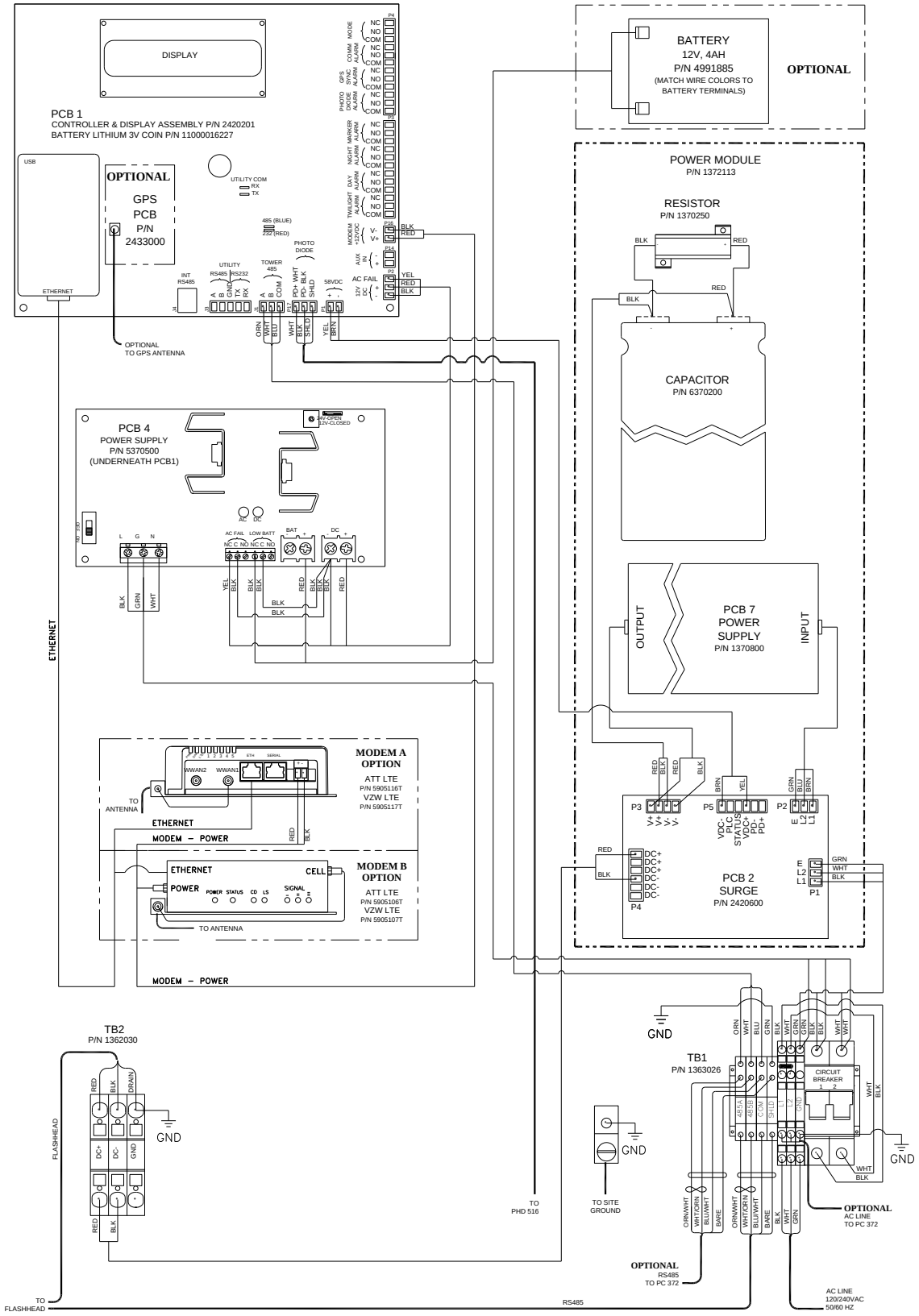


Figure 2-34 – SC 372 (AC) Internal Wiring with Modem Option

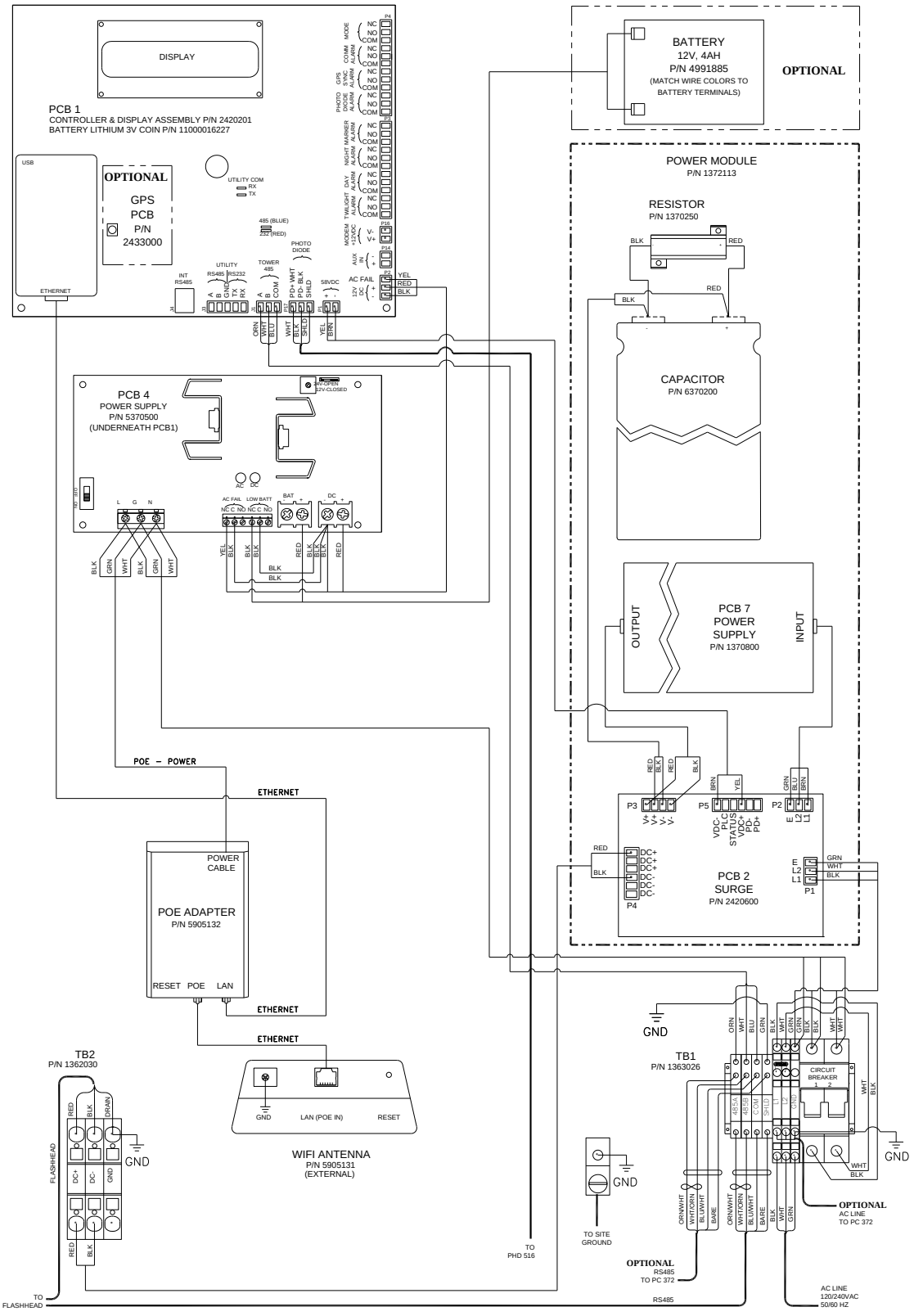


Figure 2-35 – SC 372 (AC) Internal Wiring with Wi-Fi Option

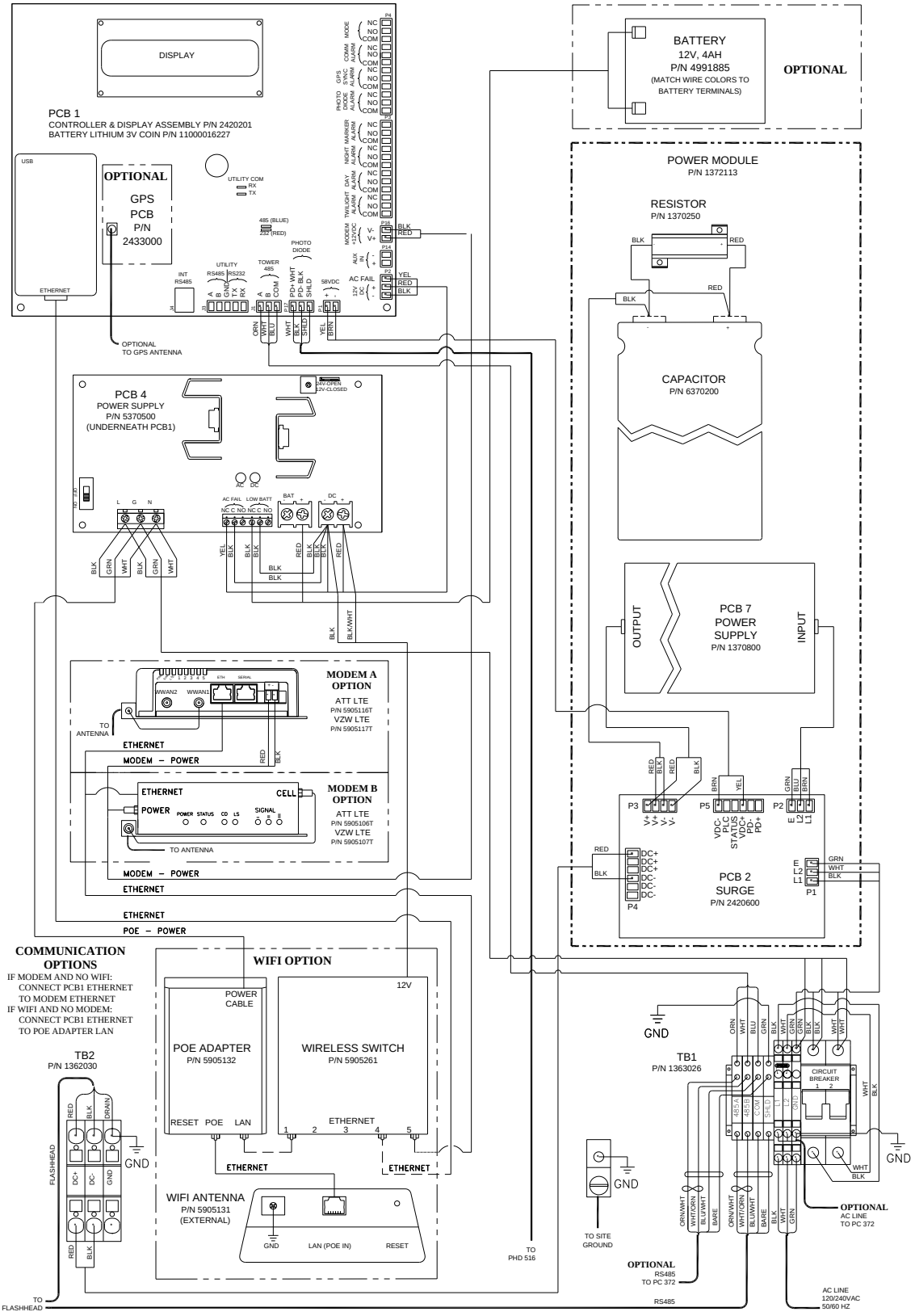


Figure 2-36 – SC 372 (AC) Internal Wiring with Modem & Wi-Fi Options

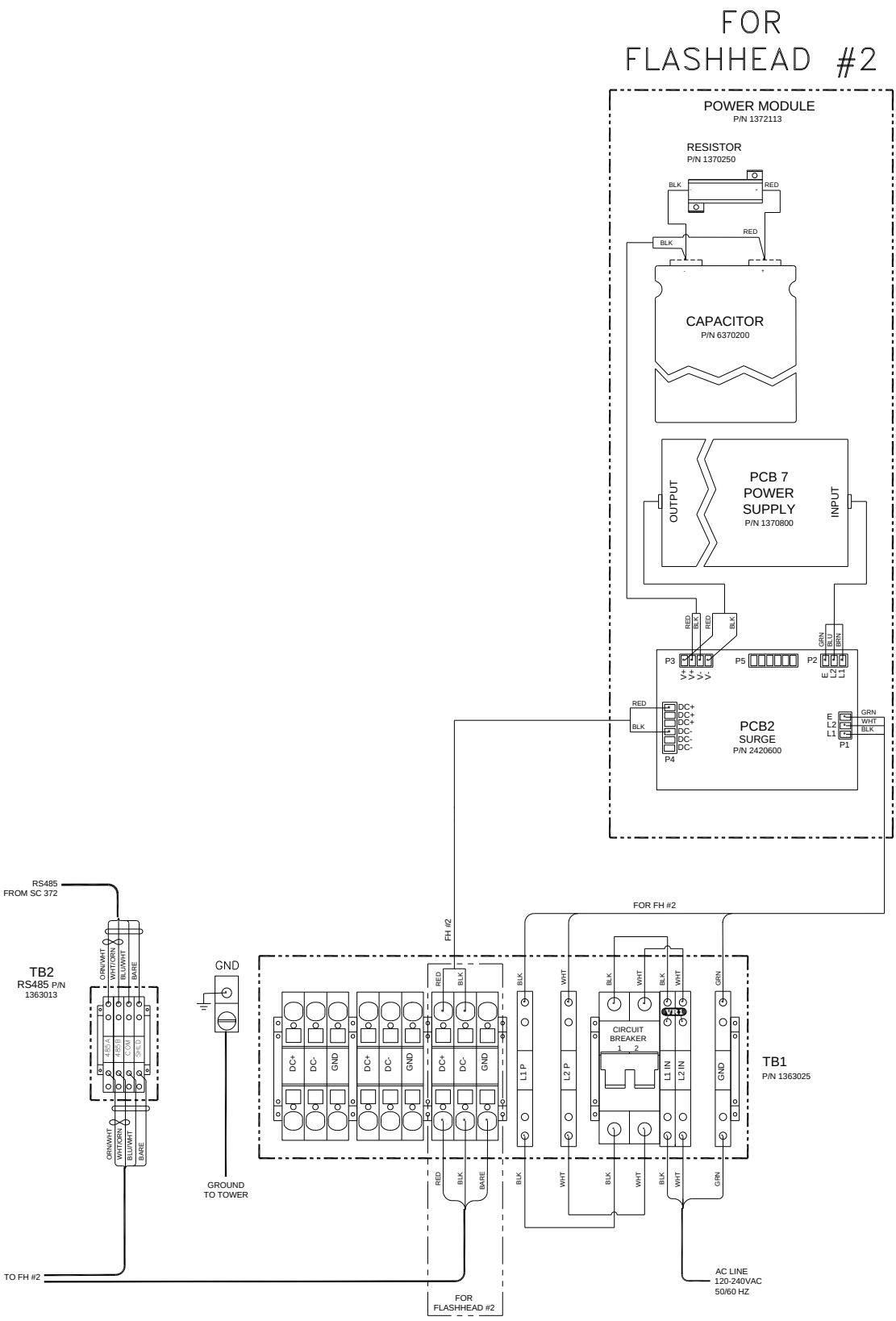


Figure 2-37 – PC 372 (AC) Internal Wiring for E1+1, D1+1

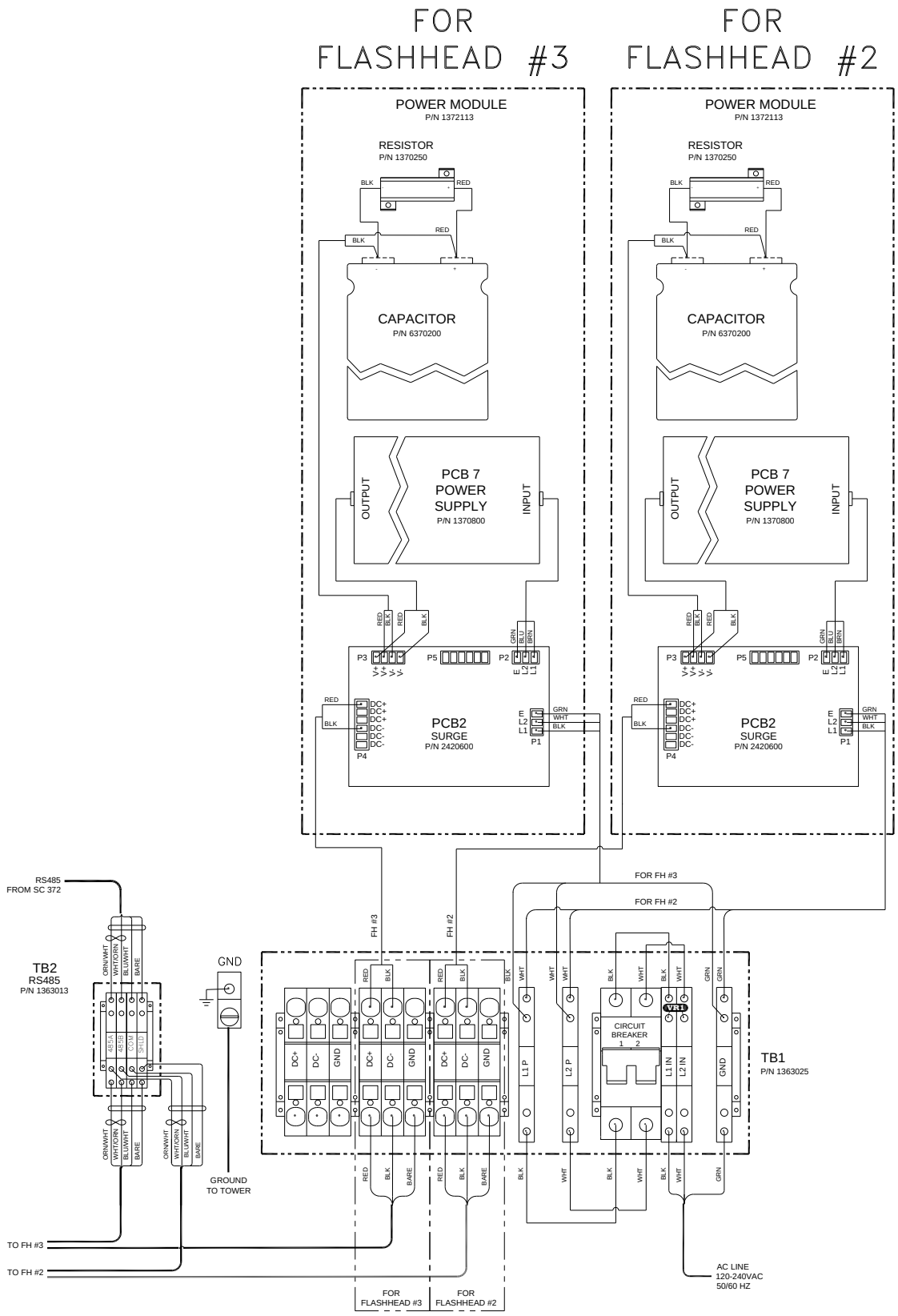


Figure 2-38 – PC 372 (AC) Internal Wiring for E2, D2

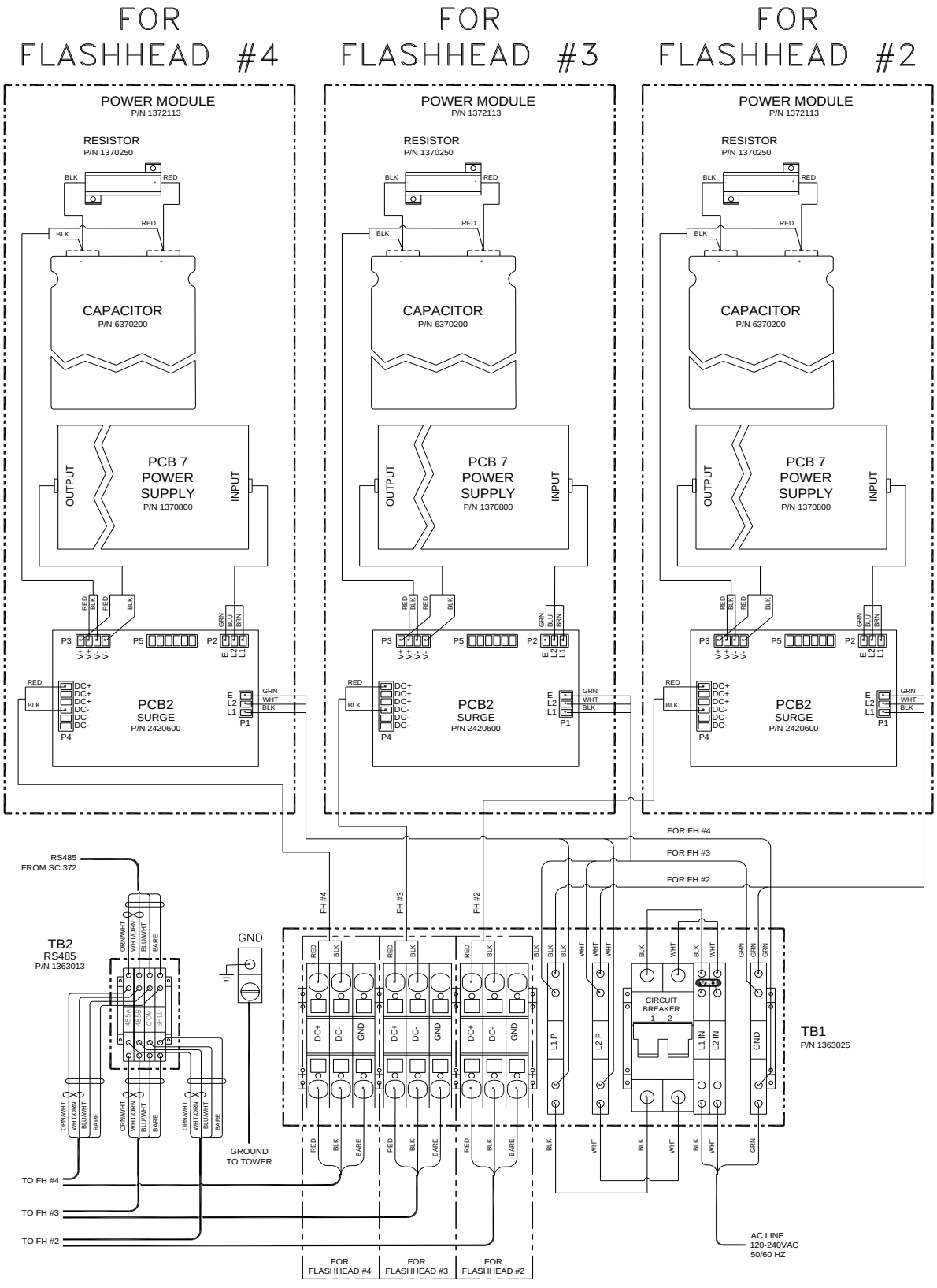


Figure 2-39 – PC 372 (AC) Internal Wiring for E2+1, D2+1

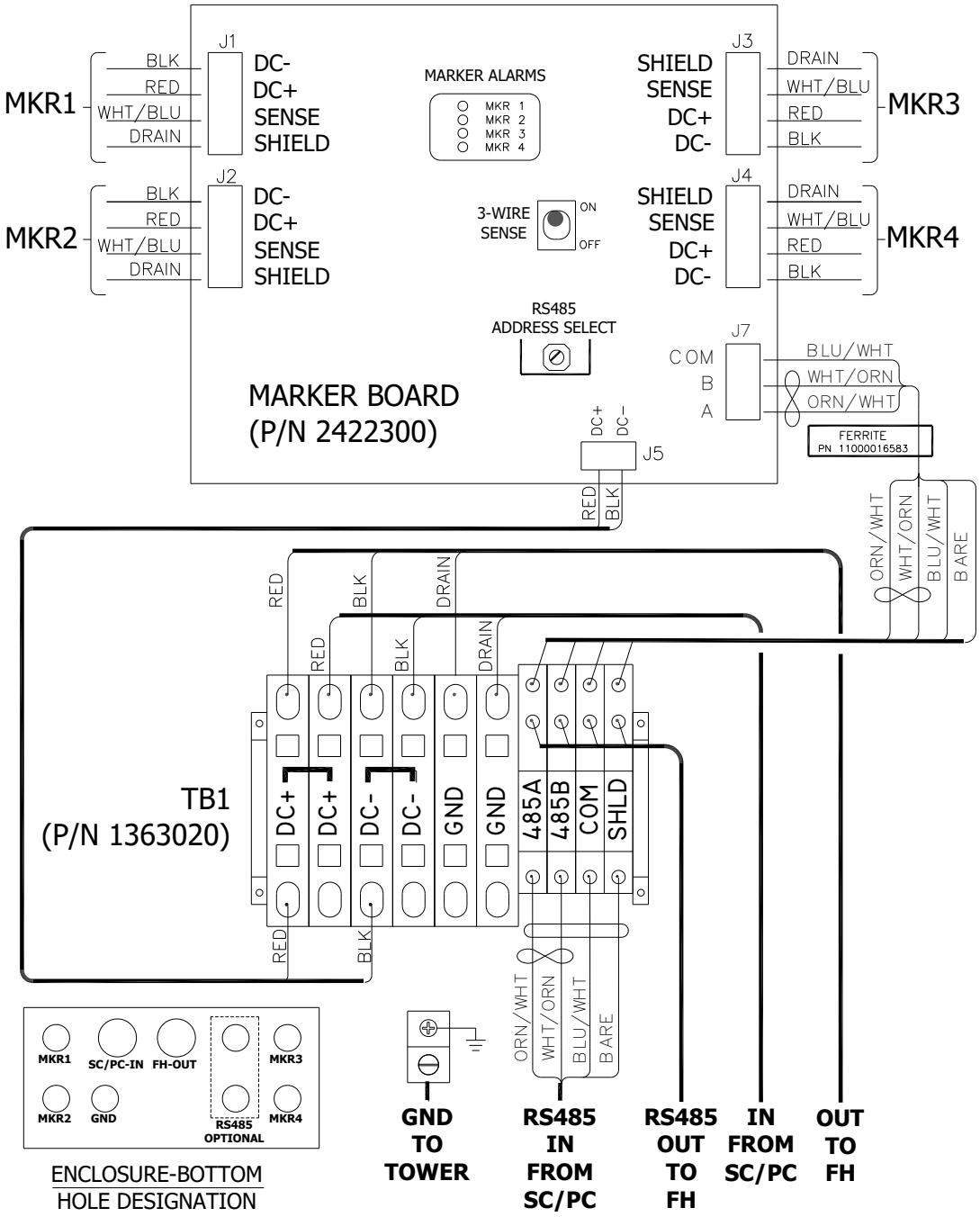


Figure 2-40 – Marker Interface Wiring Diagram

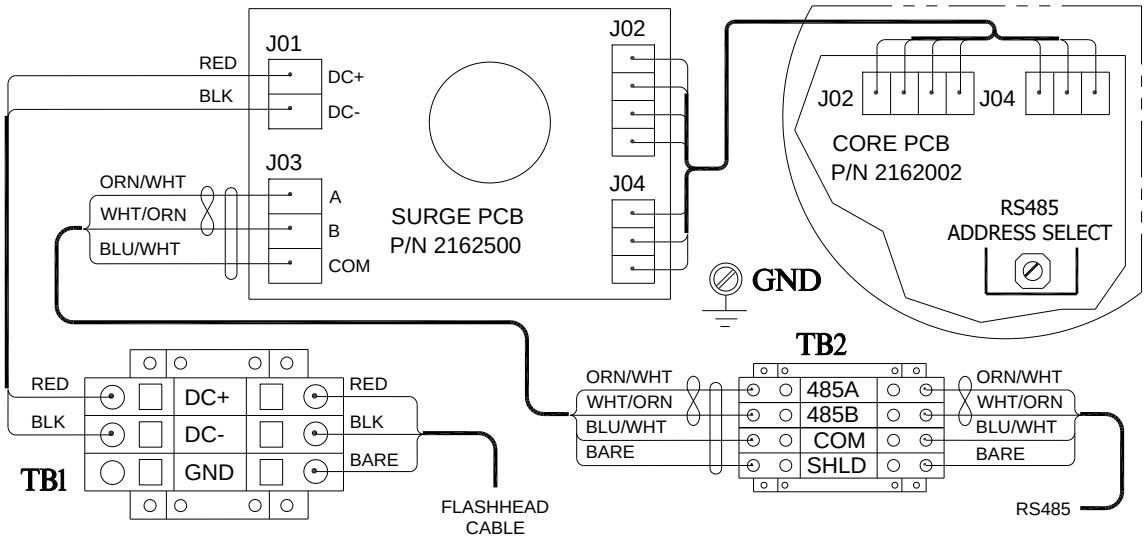


Figure 2-41 – FH 372 Wiring Diagram

SECTION 3 – INFORMATION DISPLAY

NAVIGATING THE INFORMATION DISPLAY

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

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

Figure 3-1 – Information Display

Table 3-1 – Controller Display Buttons

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 3.5 seconds then release to return to the previous menu. Press and hold for longer than 5 seconds to return to the main menu.
S3 DOWN ⬇	Navigates DOWN through the active menu options.

Table 3-2 – Top Level Menu Options[1]

Menu Option	Description
SITE TOWER CONFIG	Selects the overall system configuration.
MONITORING CONFIG[2]	Selects the type of monitoring equipment that will be used to monitor the system.
MONITORING STATUS[2]	Provides status of the built-in monitoring system.
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	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 1024 hours.
FACTORY TEST	Factory use only.
SYSTEM SETTINGS	Allows the user to reboot the system without physically interrupting input power or to restore configuration settings to factory default values. Also allows setting the real time clock's date/time + time-zone

[1] Menu options and features are based on firmware version 04/30/2022 (C4.0.0)
[2] Menu options are available only in a system with Smart features enabled.

SITE TOWER CONFIG

The Site Tower Configuration menu enables programming of the lighting type, total quantity of beacons installed, flash rate and the marker operation as flashing or steady. Optional GPS synchronization and delay programming are provided in this menu as well.

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

TOWER TYPE

This menu options specifies whether or not the tower lighting system should be red, white or both (dual). The following table illustrates the relationship between these different modes and how the system would run during different times of the day.

Tower Type	DAY	NIGHT	Usage
RED	OFF	RED	FAA Style A
WHITE	WHITE	WHITE	FAA Style D
DUAL	WHITE	RED	FAA Style E

MARKER MODE

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

RED FLASH MODE

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

GPS SYNC

GPS Sync allows the FTS 372 system to wirelessly synchronize with other lighting systems without regard to distance. GPS Delay adds the flexibility to synchronize with lighting systems from other manufacturers by adding an adjustable delay (0 - 3000 ms) to the flash output.

CATENARY

Catenary lighting systems require three levels (tiers) of lights. Therefore, a SC 372 must be paired with one or more PC 372's to control and power the associated flashheads required for catenary operation. Catenary position programming is located in the Site Tower Configuration (page 86) menu. At least one unit must be programmed for each of the following positions: top, middle and bottom.

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

DRY CONTACTS

Dry contact monitoring is available regardless of any additional method selected to monitor the system. The SC 372 monitors and communicates all alarms for the lighting system.

PHOTODIODE ALARM

The Photodiode alarm is activated if more than 19 hours have passed since the system has changed modes via the photodiode input.

If the optional GPS capability is installed, the tower will default to GPS based location data in a pre-set sunrise/sunset calendar when the photodiode alarm is activated.

If GPS capability is not installed, the unit will switch to mode control settings which can be manipulated through the user menu.

NOTE: The included GPS antenna must be installed and functioning correctly.

DISARM PHOTODIODE ALARM

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

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

AUXILIARY INPUT

The Auxiliary Input allows an external device, such as a radar system, to inhibit the output of the beacon. Connections for the Auxiliary Input are discussed in P14 Auxiliary Input (page 23) and shown in Figures 2-33 – 2-36 (page 76 - 79). A description of each Auxiliary Input menu option is described in the following bullet points:

- Help provides a description of the Auxiliary Input menu.
- Command Status indicates the current mode (On or Off) being commanded by the external control device.
- Control Type sets the type of input for the external control device. Options in the Control Type menu are: Disabled (external control not activated), Modbus (Technical Bulletin "SC 372 SMART Modbus interface") and Dry Contact (contact closure required to inhibit light output).
- Confirm Output Configuration allows any alarm contact to be "reassigned" to indicate that the system is operating normally while the flash is inhibited.
- Heartbeat used only when Auxiliary Input is controlled by Modbus to provide a fail-safe in the event of a communications failure between the SC 372 and the external control device.

IR ENABLE

This option allows the system to enable or disable IR (Infrared) output of IR capable beacons.

The option is automatically disabled if the tower is reconfigured to "White Only"

Note: IR Enable must be set to "Yes" for IR operation on FH 372d IR. See Section 1 FH 372d/w/r for additional information regarding IR.

IR IS NIGHT ALARM

When set to “Yes”, a detected malfunction in the IR circuit of the FH 372d 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.

REGULATORY SPECIFICATION

This option shows to which lighting specification the system will adhere. Choices are 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 connected to the system will generate a config alarm.

AOL BEACON

Dual lighting systems require that the malfunction of any uppermost red beacon place the entire system in white night backup. The FH372 MI AOL CONFIG option allows the uppermost beacons to be programmed to meet this requirement. All uppermost beacons must be programmed as AOL beacon.

Table 3-3: - Site Tower Configuration Menu Options

Site Tower Configuration	TOWER TYPE	Red	
		White	
		Dual	
	# OF HI BCN TIERS (Number of High-Intensity Beacon Tiers)	***Option not available when Tower Sys Mode is set to MEDIUM INTENSITY***	
	HI BEACONS PER TIER	***Option not available when Tower Sys Mode is set to MEDIUM INTENSITY***	
	# OF FH 372 BCNS	0-8	
	NUM OF MKR TIERS (Number of Marker Tiers)	0-8	
	MARKERS PER TIER[1]	MARKER TIER[1-8] (# of markers)	MKRTIER NOT PRESENT (0), 1-4
	REGULATORY SPEC	FAA	
		ICAO	
		CAR 621	

[1] 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.

FPM RED Flashes Per Minute Red		20 FPM		
		30 FPM		
		40 FPM		
		60 FPM		
FPM WHITE Flash Per Minute - White		40 FPM		
		60 FPM		
GPS SYNC[1]		Enable/Disable		
GPS Delay		Load Default Value	Yes /No	
			Yes Confirm?	
		0000 ms Valid Range 0-3000		
Disarm PD (Photodiode) Alarm[2]		On /Off		
MODE CONTROL SCHED (Mode Control Schedule)		NIGHT TO TWI (Night to Twilight)		
		TWI TO DAY (Twilight to Day): Not functional in medium intensity		
		DAY TO TWI (Day to Twilight)		
		TWI TO NIGHT (Twilight to Night): Not functional in medium intensity		
TWR MODE CTRL (Tower Mode Control)		PHOTODIODE/GPS/SCHEDULE		
TOWER SYS MODE		HIGH INTENSITY/MEDIUM INTENSITY/HI FH IN MI MODE		
Auxiliary Input	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		

[1] GPS SYNC must be Enabled for GPS Delay menu to be displayed

[2] 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.

		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[1]	Range Is 0 – 65535 (Value 100 = 10.0s)		
	MKR MODE[2]		STEADY	FLASHING	
	IR Enable		Help	To enable infrared beacon, the beacon must support IR.	
			Yes/No		
	IR IS NIGHT ALM (IR is night alarm)		When selected an IR alarm will also cause a night alarm. Yes/No		
	# OR RLY BOARDS (Number of Relay Boards)		***Option not available when Tower Sys Mode is set to MEDIUM INTENSITY***		
	RELAY BOARD CONFIG		***Option not available when Tower Sys Mode is set to MEDIUM INTENSITY***		
	Catenary		Disabled/60FPM/40FPM		
	CATENARY CONFIG[3]		FH 372 BCN#		MIDDLE
					TOP
					BOTTOM

[1] Used only when Auxiliary Input is controlled by Modbus to provide a fail-safe in the event of a communication failure between the SC 372 and the external control device.
[2] If 'Flashing' is selected, the markers will flash in synchronization with the beacon.
[3] Catenary Level menu option is only available if the Site Tower Configuration is programmed for Catenary.

	FH372 MI AOL CONFIG (Medium Intensity AOL configuration)	FH372 BCN#	YES/NO
	SKIP WHT NIGHT LI	Yes/No	

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

MONITORING CONFIG

This menu option is available in a system with Smart features enabled.

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 the SC 372 to properly operate on the connected network.

When SC 372 utilizes a cellular modem the settings should be as follows:

IP Address Mode: Static

IP Address: 192.168.1.11

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.10

The MAC Address is not editable.

PRIMARY DATA MONITORING

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

- **Cellular Eagle** - selected when the system is purchased with a cellular modem and will be monitored by the Flash Technology NOC.
- **RS 485 Modbus RTU** - used to connect via serial cable to an external monitoring device on site that supports Modbus protocol.
- **Ethernet SNMP** - used to connect via Ethernet to a server that is able to monitor SNMP traps.
- **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.
- **Ethernet Eagle -** selected when the system will be connected to the Flash Technology NOC

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.

Table 3-4: - Monitoring Configuration Menu Options

Load Factory Default	Yes /No		
	Yes Confirm?		
	Default of Primary / Alternate Monitoring		
Local Ethernet Configuration	IP Address Mode		Static
			Dynamic
	IP Address		XXX.XXX.XXX.XXX
	Subnet Mask		XXX.XXX.XXX.XXX
	Default Gateway		XXX.XXX.XXX.XXX
	MAC Address		XXXXXXXXXXXX
	Commit Settings		Yes /No
	(When any above configurations are changed, settings this option to yes and confirm is mandatory to make the settings effective)		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 (Pre-configured, not allowed to change)	
		Primary Server Port 54630 (Pre-configured, not allowed to change)	
		Alternate Server IP Address (Pre-configured, not allowed to change)	
		Alternate Server Port 54630 (Pre-configured, not allowed to change)	
		Listen Port 54631 (Pre-configured, not allowed to change)	
		Sim Card: (AT&T Direct, AT&T ROW2 or Customized)[1]	Select AT&T Direct (SIM is Blue/White Front, Orange Back)
			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

[1] Menu option applies to AT&T modems only. Menu is not applicable when Verizon modem is installed

<table>
<tr><td rowspan="15"></td><td rowspan="3">Monitoring Method: RS 485 Modbus RTU</td><td colspan="2">Autoupdate: Disabled</td></tr>
<tr><td colspan="2">Baud Rat: 9600</td></tr>
<tr><td colspan="2">Station Address: Default is 2 (Enter Value Ranging From 0 – 240)</td></tr>
<tr><td rowspan="7">Monitoring Method: Ethernet SNMP[1]</td><td rowspan="2">Autoupdate: XX Hours - XX Minutes</td><td>Hours (Enter Value Ranging From 0 - 24)</td></tr>
<tr><td>Minutes (Enter Value Ranging From 0 - 59)</td></tr>
<tr><td colspan="2">Primary Server IP Address (Enter IP Address)</td></tr>
<tr><td colspan="2">Primary Server Port (Enter Port Number Range Is 0 - 65535)</td></tr>
<tr><td colspan="2">Alternate Server IP Address (Enter IP Address)</td></tr>
<tr><td colspan="2">Alternate Server Port (Enter Port Number Range Is 0 - 65535)</td></tr>
<tr><td colspan="2">Listen Port (Enter Port Number Range Is 0 - 65535)</td></tr>
<tr><td rowspan="3">Monitoring Method: Ethernet Modbus</td><td colspan="2">Autoupdate: Disabled</td></tr>
<tr><td colspan="2">Listen Port: 00502</td></tr>
<tr><td colspan="2">Station Address: Default is 2 (Enter Value Ranging From 0 – 240)</td></tr>
<tr><td rowspan="7">Monitoring Method: Ethernet Eagle 2.0</td><td rowspan="2">Autoupdate: XX Hours - XX Minutes</td><td>Hours (Enter Value Ranging From 0 - 24)</td></tr>
<tr><td>Minutes (Enter Value Ranging From 0 - 59)</td></tr>
<tr><td colspan="2">Primary Server IP Address (Enter IP Address)</td></tr>
<tr><td colspan="2">Primary Server Port (Enter Port Number Range Is 0 - 65535)</td></tr>
<tr><td colspan="2">Alternate Server IP Address (Enter IP Address)</td></tr>
<tr><td colspan="2">Alternate Server Port (Enter Port Number Range Is 0 - 65535)</td></tr>
<tr><td colspan="2">Listen Port (Enter Port Number Range Is 0 - 65535)</td></tr>
<tr><td>Alternate Data Monitoring</td><td colspan="3">Same Menu as Primary Data Monitoring.[2]</td></tr>
</table>

.

[1] Ethernet SNMP, if used, must be selected as the Primary Data Monitoring method

[2] 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

This menu option is available in a system with Smart features enabled.

This menu is only applicable when Cellular Eagle is selected as Primary or Alternate Data Monitoring Method. 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.

Table 3-5: - Monitoring Status Menu Options

Monitoring Status	Signal Bars	
	Signal DB	
	CIP	
	Cell Number	
	Cell ESN	
	Since Last Poll	
	Test Connect	Yes /No
		Yes Confirm?
	Ethernet Link: (Status)	
	AT&T SIM (Display Only)	(AT&T Direct, AT&T ROW2 or Custom

LOCAL DIAGNOSTICS

The Local Diagnostics menu allows the user to review the status of the Site Event History, Display Board, Tower Control and 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 system. A few examples of events that may be found in the event history are:

- CFG CHANGE (Configuration Change)
- BCN1 COMM (Beacon 1 Communication failure)
- MKR T1 COMM -> ALM/RST (Marker Tier 1 Communication failure)
- REBOOT EVENT (Z) (System Reboot with reboot code)

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 372 maintains event times and up to 30 are displayed.

Local Diagnostics	Site Event History	Mode Override ➔ Off	Mode Override ➔ Off
			0D 0h 15M
		Mode Override ➔ On	Mode Override ➔ On
			0d 0H 20M
	Display Board	Runtime Days	i.e. 400d
		Firmware Revision	SC372DISP : Month Day Year Hours : Minutes : Seconds
			FW (Firmware) [Version X.X]
		REBOOT COUNT	
		Controller A2D	Temperature – Deg. C, Deg. F Tower Voltage DC 12V A2D
		Site Name	
		Site ID	
	Tower Control Board	Runtime Days	
		Firmware Revision	FTC 270: Month Day Year Hours Min Sec
			Firmware [Version X.X]
		Reboot Count	
		Controller A2D (Values)	Temperature – Deg. C, Deg. F
			Photo Diode Value
			Pressure
			Altitude
			Humidity
			Baud
		Site Name	
		Site ID	
		GPS (Status Only)	GPS Communications
			Antenna
			Satellites In View
			Last Sync.
			Sync Type
			Altitude
			Latitude
			Longitude

			GPS Time in UTC
	FH 372 BEACON (Beacon # (1 – 8))	Runtime Days	
		Firmware Revision	FH372: Month Day Year Hours Min Sec
			Firmware [Version X.X]
		RS 485 Communications Quality (Percentage between 0 and 100)	
		White A2D – White String 0-4 Voltage and Current	
		Red A2D – Red String 0-1 Voltage and Current	
		MISC A2D	Temperature
			Input Voltage
		IR A2D	String Voltage and Current
	MARKER TIER (marker Tier# (1 – 8))	Runtime Days	
		Firmware Revision	MKR 372: Month Day Year Hours Min Sec
			Firmware [Version X.X]
		RS 485 Communications Quality (Percentage between 0 and 100)	
		Markers Sensed	
		Marker A2D – MARKER 1-4 Currents, Marker Driver Voltage	
		MISC A2D	Temperature
			Pressure
			Altitude
			Humidity

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 (Automatic LI) or manually (Manual LI). A description of each LI mode is provided in the following bullet points:

- **Automatic 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 Automatic LI menu.
- **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.	
	Automatic LI	Begin Test (1 Button Inspection - Beacons & Markers Tested In Parallel With No User Interaction.)	Yes /No
			Yes Confirm?
			Yes Confirm?
	Manual LI	Beacon Day Alarm	Alarm/Normal
		Beacon Twilight. Alarm (Option not applicable in FTS 372)	Alarm/Normal
		Beacon White Night Alarm	Alarm/Normal
		Beacon Red Night Alarm	Alarm/Normal
		Marker Alarm	Alarm/Normal
		Photodiode Dry Contact Test	Alarm/Normal
		IR Alarm	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 1024 hours. Once the mode override function has been activated, Override Mode will show the operating mode of the system and the time left of the override.

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 - 1024)
			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)		

SYSTEM SETTINGS

This menu allows the SC 372 to restart without physically interrupting the power, or allows the configuration settings to be restored to factory default values. Setting the date and time are available here as well.

System Settings	System Reboot	Yes /No
		Yes Confirm?
	Reset Factory Default	Yes /No
		Yes Confirm?
	Customized Configuration[3]	Waiting for password
		*****
	Real Time Clock	Date
		Time
		Daylight Savings Time (Enable/Disable)
	CFGCHANGETRAP (Configuration Change Trap)	Yes/No
	SYSTEM HEALTH	Yes/No

[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 system programmed as "Tower Type White"
[3] Requires a valid password to set the customized configuration. Upon success unit will set the customized configuration based on the password entered

	Time-zone Offset (Pre-defined options)	UTC-12, UTC-11,UTC-10,HAWAII (-9),ALASKA (-8), US PACIFIC TIME(-7), US MOUNTAINTIME(-6), US CENTRAL TIME(-5), US EASTERN TIME(-4), ATLANTIC TIME(-3), UTC-2, UTC-1, UTC+0, UTC+0.5,UTC+1, UTC+1.5, UTC+2, UTC+2.5, UTC+3, UTC+3.5, UTC+4, UTC+4.5, UTC+5, UTC+5.5, UTC+6, UTC+6.5, UTC+7, UTC+7.5, UTC+8, UTC+8.5, UTC+9, UTC+9.5, UTC+10, UTC+10.5, UTC+11,UTC+11.5, UTC+12,
	Smart Serial Number	12 Character Alphanumeric Serial Number. To enable Smart features, press enter and enter the code provided.

INFORMATION DISPLAY ALARMS

The information display provides more comprehensive alarm information than the alarm LEDs located on PCB 1.

Table 3-6 – Information Display Status and Alarm Definitions

Alarm	Definition
STATUS: PWR UP MODE	Indicates that the system is in its initial boot stage.
BCN# DAY ALARM	The connected flash head is exhibiting a white day alarm.
BCN# WHT NIGHT ALARM	The connected flash head is exhibiting a white night alarm.
BCN# RED NIGHT ALARM	The connected flash head is exhibiting a red night alarm.
BCN1 IR ALARM	The connected flash head is exhibiting an Infrared alarm.
BCN# COMM ALARM	The SC 372 is experiencing a communications failure with the flash head listed
BCN1 LOW DC ALARM	Output voltage (58 VDC) to the connected flash head and marker tier (if present) is low.
MKR T# ALARM	The connected marker interface PCB is reporting failure of one or more markers.
MKR T# COMM ALARM	The SC 372 is experiencing a communications failure with the connected marker interface PCB.
CTRL COMM ALARM	Communication issue with the Tower Controller. With this alarm being active we do not have any visibility into tower lighting devices.
TWR COMM ALARM	General Tower Device communications failure indication. Any communication failure with the tower devices (Beacon/marker tier) will generate a TWR COMM failure. This alarm will be accompanied by a specific beacon/marker tier communication alarm.
GPS SYNC ALARM	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 the GPS Board for “short” or “open” indication. • GPS Board failure.
PHOTODIODE ALARM	More than 19 hours have passed since the system has changed modes via the photodiode input.
POWER FAIL	Primary input power failure. PCB 1 is operating on battery backup to provide alarm notification.

LI TEST MODE	Indicates that SC 372 is conducting a Lighting Inspection test on the system.
MODE OVERRIDE(SOURCE)	Indicates that the mode override is issued. Source of the mode override is mentioned in the parenthesis such as Display, Webpage or SNMP.
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.
# RAPID REBOOT	Device is reporting excessive reboots. E.g. CTRL RAPID REBOOT, BCN1 RAPID REBOOT.
PRESS ANY PUSH BUTTON TO ACTIVATE MODE SWITCH	Manual mode switch is not activated until a push button is pressed.

SECTION 4– WEB INTERFACE

WEB INTERFACE (OPTIONAL)

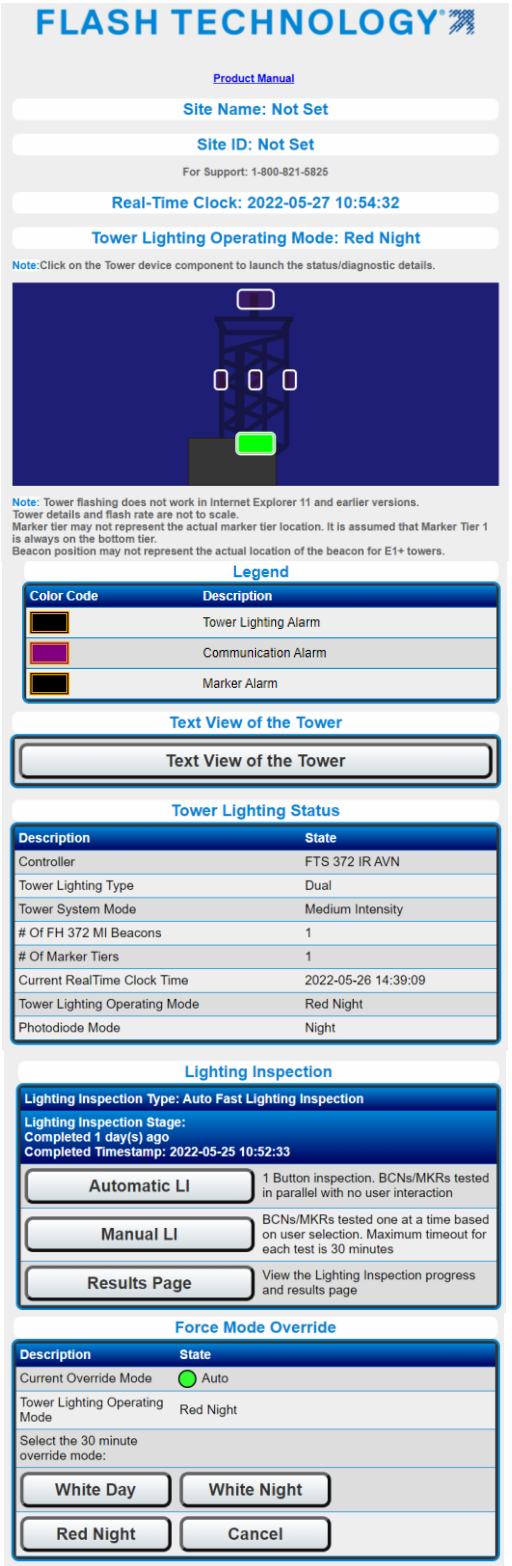
The Web Interface provides a convenient way to configure the system, perform Lighting Inspections and temporarily control mode remotely. Additionally, useful information such as alarm and event history, cumulative runtime and component temperature may be viewed.

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

Follow the steps below to connect the portable device to the host SC 372 unit using the installed Wi-Fi. When connected, the web browser will display a screen similar to the one shown to the right.

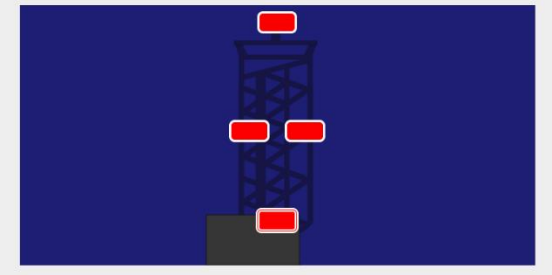
Web Interface Access (Wi-Fi):

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



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

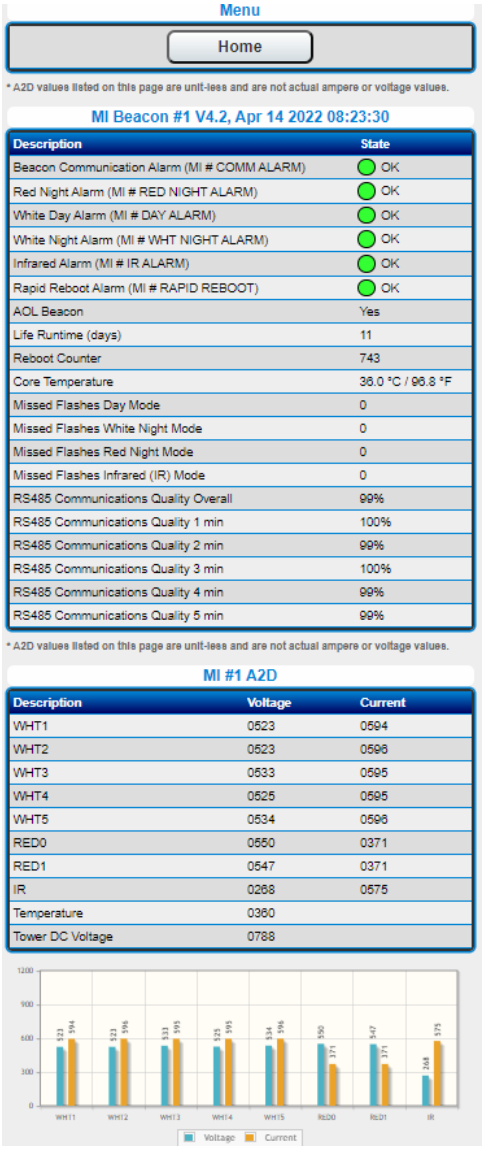
The Tower Lighting Status is summarized in the table below the legend.

Tower Lighting Status

Description	State
Controller	FTS 372 IR AVN
Tower Lighting Type	Dual
Tower System Mode	Medium Intensity
# Of FH 372 MI Beacons	1
# Of Marker Tiers	1
Current RealTime Clock Time	2022-05-25 14:13:43
Tower Lighting Operating Mode	Day
Photodiode Mode	Day
Total Alarms	4

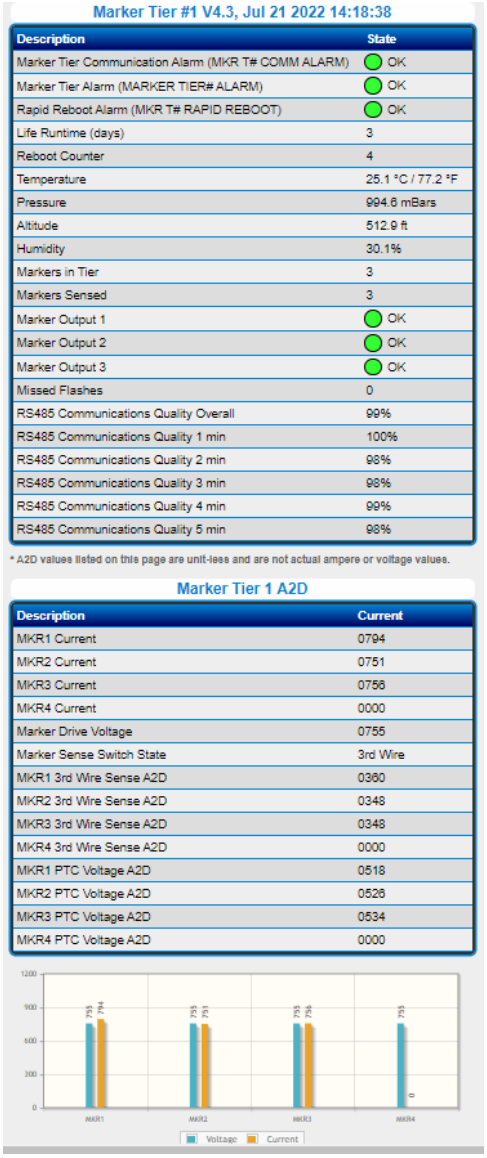
DIAGNOSTICS

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).



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).



Marker Tier #1 V4.3, Jul 21 2022 14:18:38

Description	State
Marker Tier Communication Alarm (MKR T# COMM ALARM)	OK
Marker Tier Alarm (MARKER TIER# ALARM)	OK
Rapid Reboot Alarm (MKR T# RAPID REBOOT)	OK
Life Runtime (days)	3
Reboot Counter	4
Temperature	25.1 °C / 77.2 °F
Pressure	994.6 mBars
Altitude	512.9 ft
Humidity	30.1%
Markers in Tier	3
Markers Sensed	3
Marker Output 1	OK
Marker Output 2	OK
Marker Output 3	OK
Missed Flashes	0
RS485 Communications Quality Overall	99%
RS485 Communications Quality 1 min	100%
RS485 Communications Quality 2 min	98%
RS485 Communications Quality 3 min	98%
RS485 Communications Quality 4 min	99%
RS485 Communications Quality 5 min	98%

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

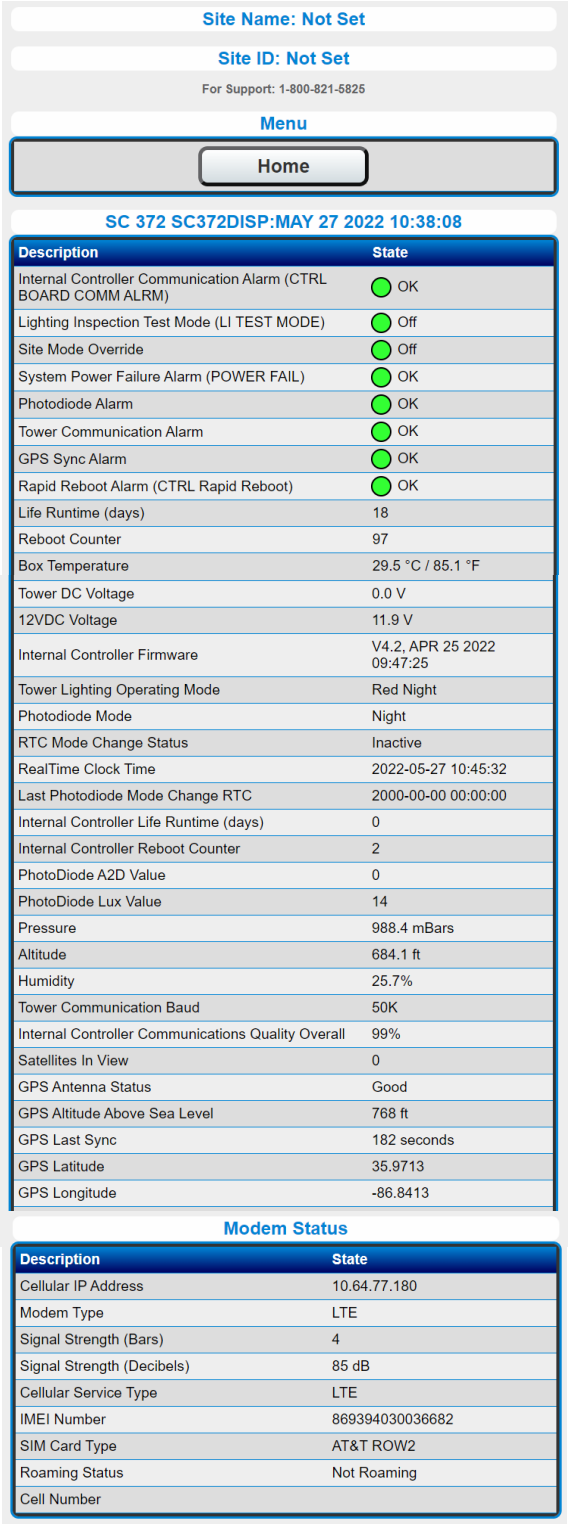
Marker Tier 1 A2D

Description	Current
MKR1 Current	0794
MKR2 Current	0751
MKR3 Current	0756
MKR4 Current	0000
Marker Drive Voltage	0755
Marker Sense Switch State	3rd Wire
MKR1 3rd Wire Sense A2D	0360
MKR2 3rd Wire Sense A2D	0348
MKR3 3rd Wire Sense A2D	0348
MKR4 3rd Wire Sense A2D	0000
MKR1 PTC Voltage A2D	0518
MKR2 PTC Voltage A2D	0526
MKR3 PTC Voltage A2D	0534
MKR4 PTC Voltage A2D	0000

SYSTEM CONTROLLER

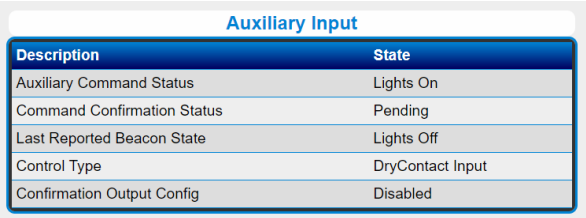
System Controller information is accessed by clicking on the System Controller in the tower graphic. Operational Status and Alarms are indicated by color code.

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



AUXILIARY INPUT

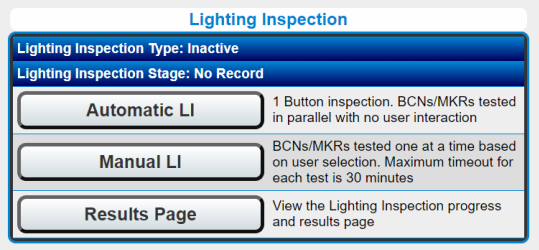
If enabled, “Auxiliary Input” section is shown at the top of the System Controller Menu. This menu is informational only and displays the configuration and current status of the interface.



Note: Refer to P2 Auxiliary Input (page 23), Site Tower Config - Auxiliary Input (page 87), and Tower Lighting Config (page 110) for additional information regarding configuration of the Auxiliary Input.

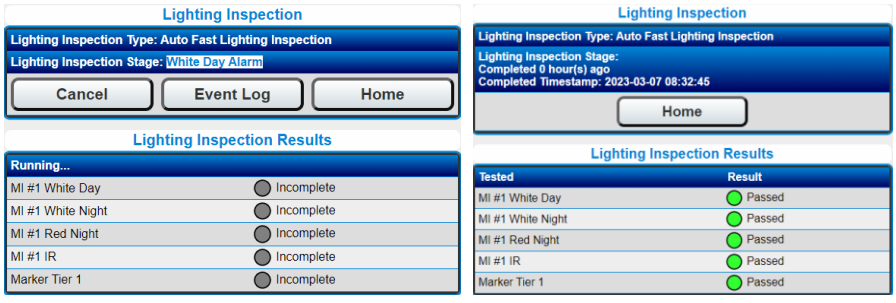
LIGHTING INSPECTION (LI)

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.



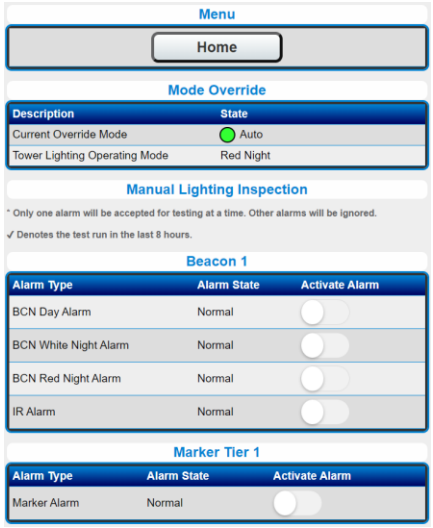
AUTO FAST LI

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



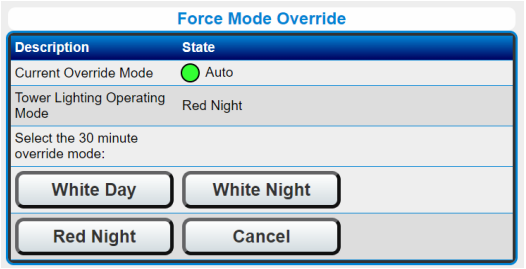
MANUAL LI

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.



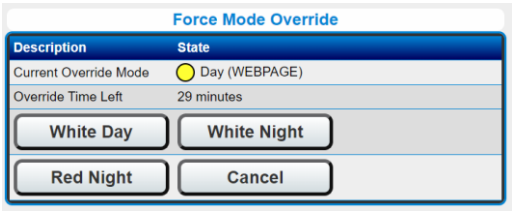
MODE OVERRIDE

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”.



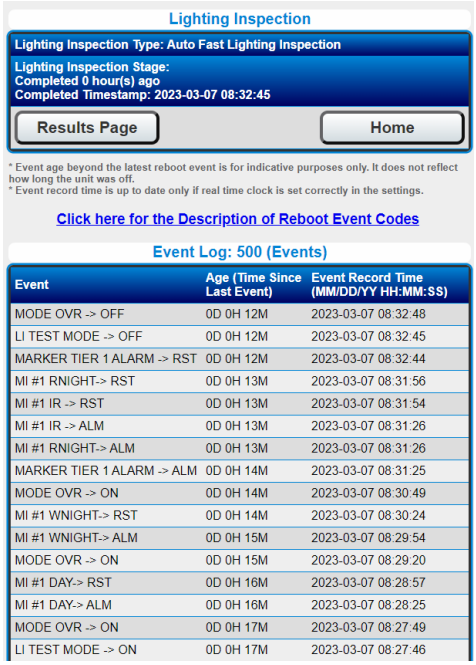
EVENT LOG

The Event Log displays all events or alarms (up to 500) affecting the operation of the SC 372. 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.

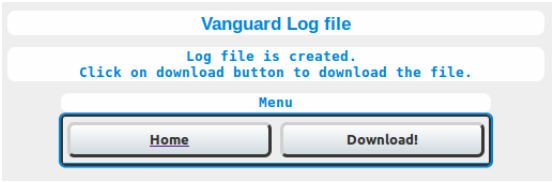


Event	Age (Time Since Last Event)	Event Record Time (MM/DD/YY HH:MM:SS)
MODE OVR -> OFF	0D 0H 12M	2023-03-07 08:32:48
LI TEST MODE -> OFF	0D 0H 12M	2023-03-07 08:32:45
MARKER TIER 1 ALARM -> RST	0D 0H 12M	2023-03-07 08:32:44
MI #1 RNIGHT-> RST	0D 0H 13M	2023-03-07 08:31:56
MI #1 IR -> RST	0D 0H 13M	2023-03-07 08:31:54
MI #1 IR -> ALM	0D 0H 13M	2023-03-07 08:31:26
MI #1 RNIGHT-> ALM	0D 0H 13M	2023-03-07 08:31:26
MARKER TIER 1 ALARM -> ALM	0D 0H 14M	2023-03-07 08:31:25
MODE OVR -> ON	0D 0H 14M	2023-03-07 08:30:49
MI #1 WNIGHT-> RST	0D 0H 14M	2023-03-07 08:30:24
MI #1 WNIGHT-> ALM	0D 0H 15M	2023-03-07 08:29:54
MODE OVR -> ON	0D 0H 15M	2023-03-07 08:29:20
MI #1 DAY-> RST	0D 0H 16M	2023-03-07 08:28:57
MI #1 DAY-> ALM	0D 0H 16M	2023-03-07 08:28:25
MODE OVR -> ON	0D 0H 17M	2023-03-07 08:27:49
LI TEST MODE -> ON	0D 0H 17M	2023-03-07 08:27:46

Note: The SC 372 reboot events are coded by reason. The reboot event codes can be viewed by clicking on the link in the **Event Log** page.

DOWNLOAD LOG FILE

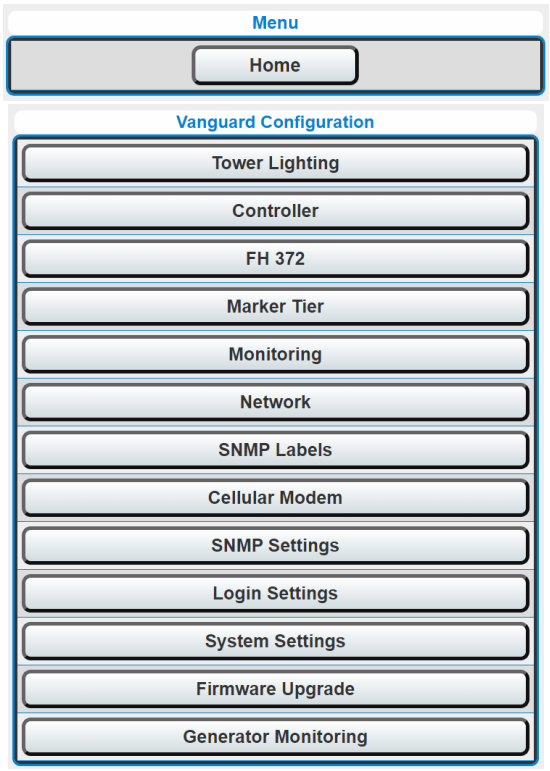
The Download Log File page allows the user to download the log file from the unit for analysis by Tech Support. Click on Download button to download the log file.



CONFIGURATION

The Configuration menu provides access to program all functions of the lighting system. The configuration menu is shown below.

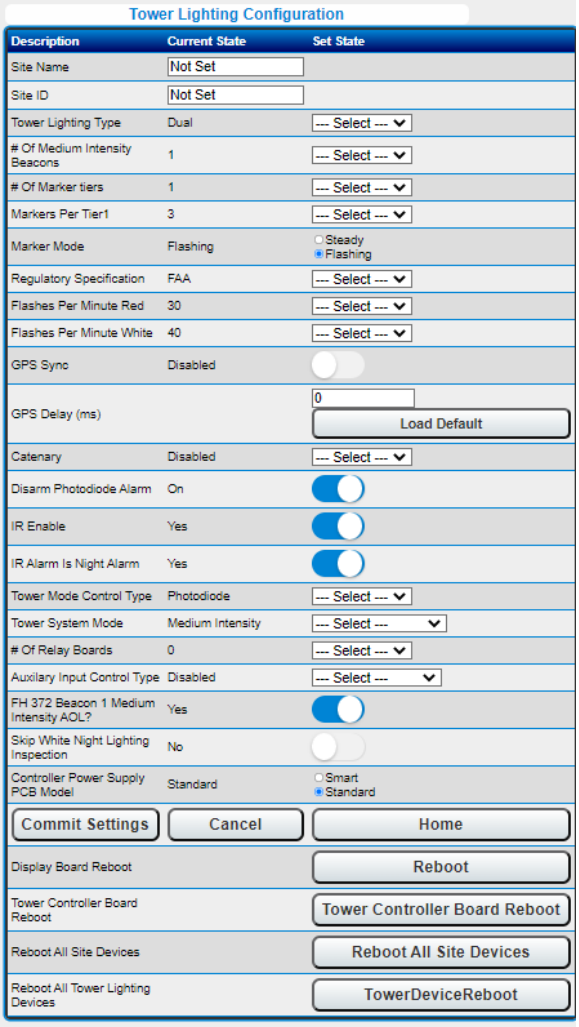
The headings following the pictorial provide a brief overview of each top level Configuration menu option.



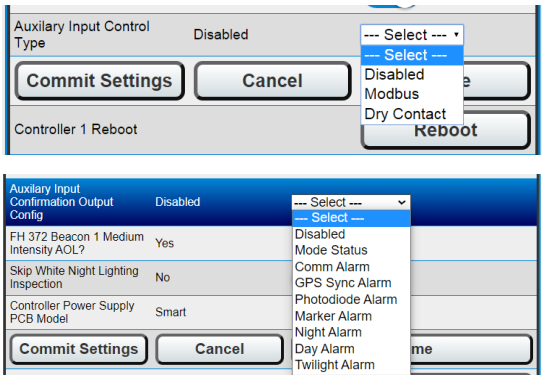
Note: In the event of a communication failure, the last known A2D values will be displayed along with a warning message.

TOWER LIGHTING CONFIG

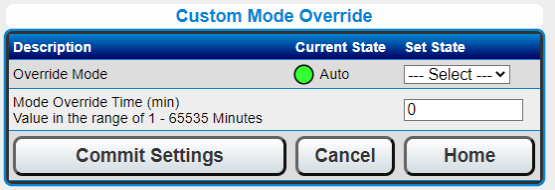
The Tower Lighting menu provides all programming options discussed in Site Tower Config (page 86). It also adds the option to input the site name and site ID.



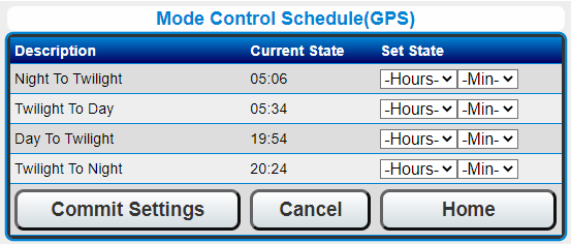
Options for configuration of Auxiliary Input Control Type and Confirmation Output are shown below.



Custom Mode Override allows for a custom override time longer than 30 minutes.



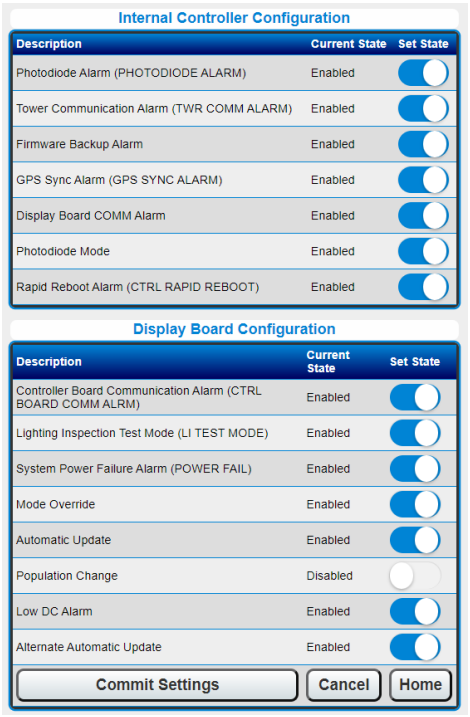
Mode Control Schedule allows for a specific transition time for different modes at a set time. These times are used if Tower Mode Control Type is set to “Schedule” or if it is set to “GPS” and there is a GPS failure. The real-time clock should be set appropriately for the location of the system.

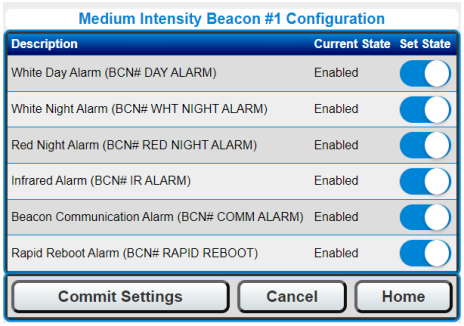


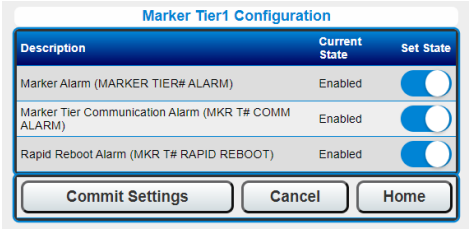
CONTROLLER

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.

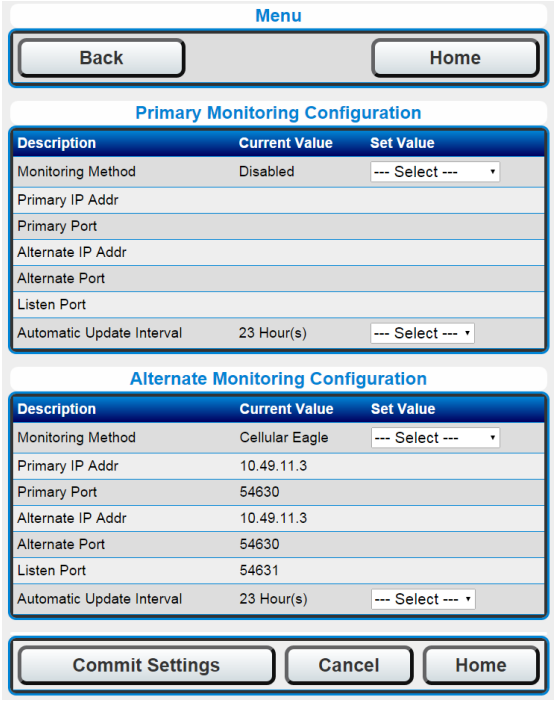






MONITORING

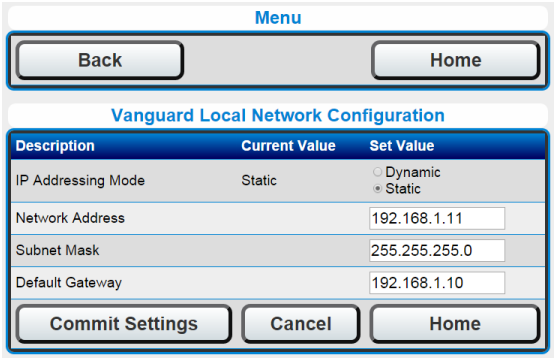
The Monitoring menu allows selection of the Primary and Alternate data monitoring methods discussed in Monitoring Config (page 91).



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/).

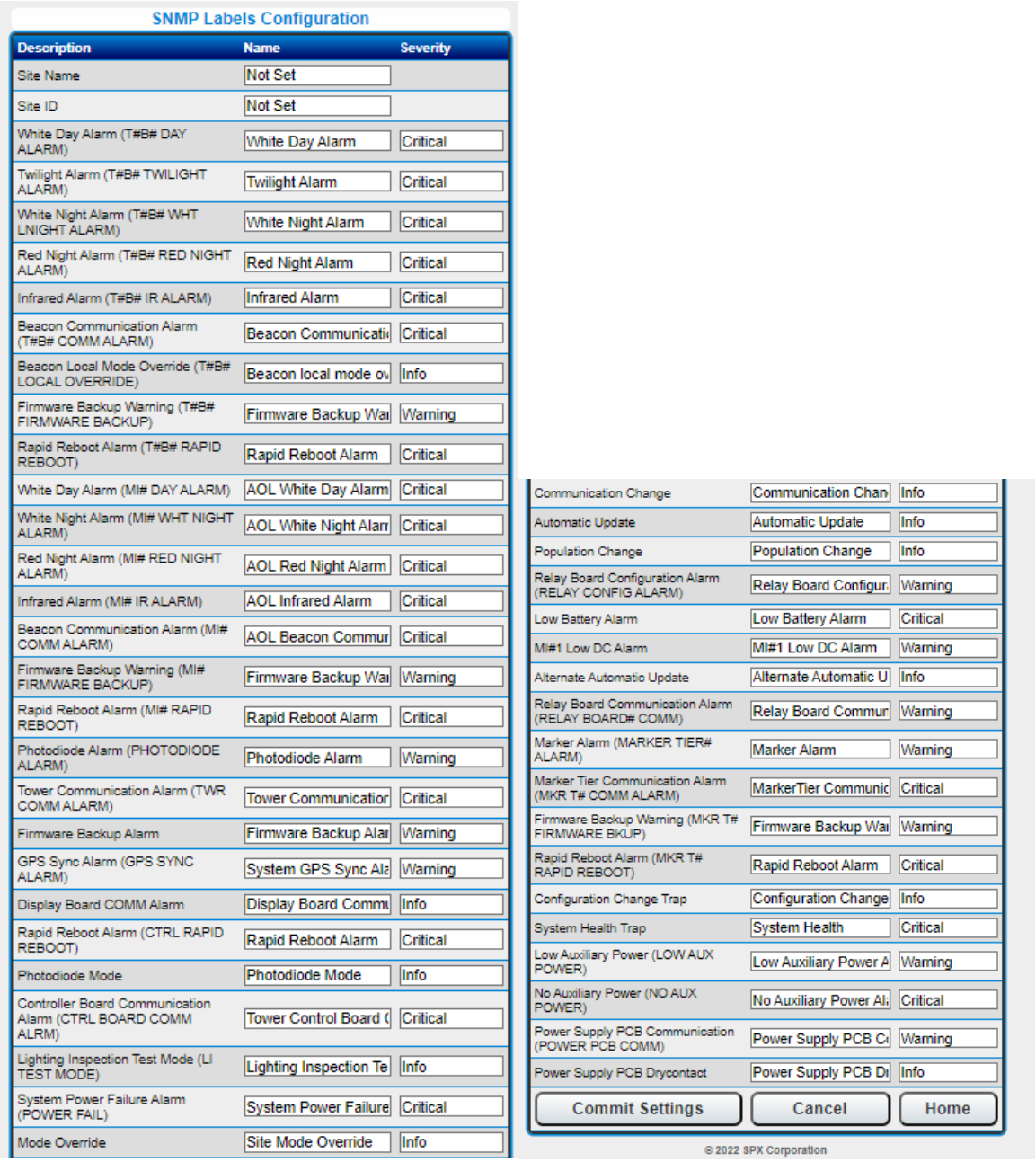
NETWORK

Once the Primary and Alternate monitoring methods are selected, the appropriate configuration options for each method are available in the Network menu.



SNMP LABELS

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



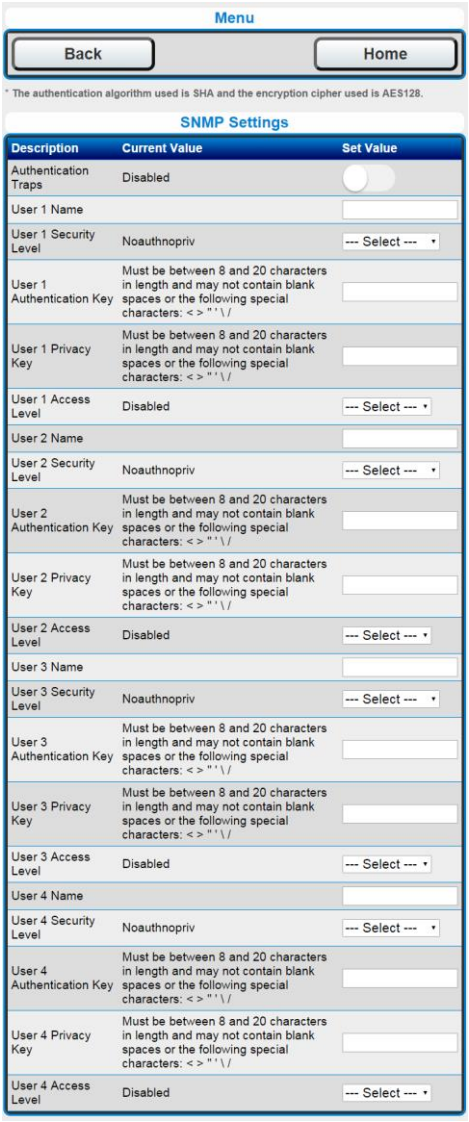
SNMP Labels Configuration

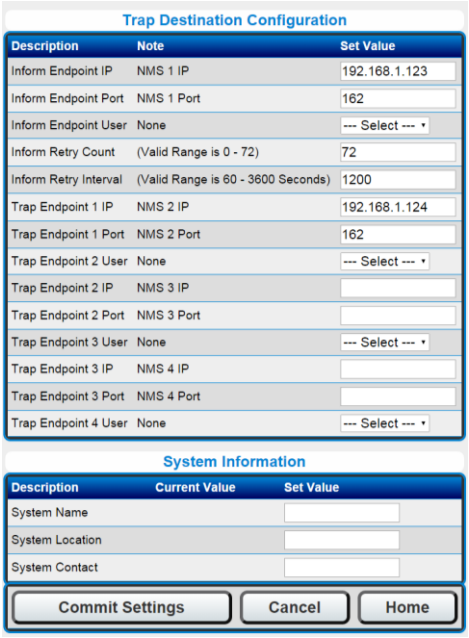
Description	Name	Severity
Site Name	Not Set	
Site ID	Not Set	
White Day Alarm (T#B# DAY ALARM)	White Day Alarm	Critical
Twilight Alarm (T#B# TWILIGHT ALARM)	Twilight Alarm	Critical
White Night Alarm (T#B# WHT LNIGHT ALARM)	White Night Alarm	Critical
Red Night Alarm (T#B# RED NIGHT ALARM)	Red Night Alarm	Critical
Infrared Alarm (T#B# IR ALARM)	Infrared Alarm	Critical
Beacon Communication Alarm (T#B# COMM ALARM)	Beacon Communicati	Critical
Beacon Local Mode Override (T#B# LOCAL OVERRIDE)	Beacon local mode ov	Info
Firmware Backup Warning (T#B# FIRMWARE BACKUP)	Firmware Backup Wai	Warning
Rapid Reboot Alarm (T#B# RAPID REBOOT)	Rapid Reboot Alarm	Critical
White Day Alarm (MI# DAY ALARM)	AOL White Day Alarm	Critical
White Night Alarm (MI# WHT NIGHT ALARM)	AOL White Night Aları	Critical
Red Night Alarm (MI# RED NIGHT ALARM)	AOL Red Night Alarm	Critical
Infrared Alarm (MI# IR ALARM)	AOL Infrared Alarm	Critical
Beacon Communication Alarm (MI# COMM ALARM)	AOL Beacon Commur	Critical
Firmware Backup Warning (MI# FIRMWARE BACKUP)	Firmware Backup Wai	Warning
Rapid Reboot Alarm (MI# RAPID REBOOT)	Rapid Reboot Alarm	Critical
Photodiode Alarm (PHOTODIODE ALARM)	Photodiode Alarm	Warning
Tower Communication Alarm (TWR COMM ALARM)	Tower Communicatior	Critical
Firmware Backup Alarm	Firmware Backup Alar	Warning
GPS Sync Alarm (GPS SYNC ALARM)	System GPS Sync Ala	Warning
Display Board COMM Alarm	Display Board Commu	Info
Rapid Reboot Alarm (CTRL RAPID REBOOT)	Rapid Reboot Alarm	Critical
Photodiode Mode	Photodiode Mode	Info
Controller Board Communication Alarm (CTRL BOARD COMM ALRM)	Tower Control Board (	Critical
Lighting Inspection Test Mode (LI TEST MODE)	Lighting Inspection Te	Info
System Power Failure Alarm (POWER FAIL)	System Power Failure	Critical
Mode Override	Site Mode Override	Info
Communication Change	Communication Chan	Info
Automatic Update	Automatic Update	Info
Population Change	Population Change	Info
Relay Board Configuration Alarm (RELAY CONFIG ALARM)	Relay Board Configur	Warning
Low Battery Alarm	Low Battery Alarm	Critical
MI#1 Low DC Alarm	MI#1 Low DC Alarm	Warning
Alternate Automatic Update	Alternate Automatic U	Info
Relay Board Communication Alarm (RELAY BOARD# COMM)	Relay Board Commur	Warning
Marker Alarm (MARKER TIER# ALARM)	Marker Alarm	Warning
Marker Tier Communication Alarm (MKR T# COMM ALARM)	MarkerTier Communic	Critical
Firmware Backup Warning (MKR T# FIRMWARE BKUP)	Firmware Backup Wai	Warning
Rapid Reboot Alarm (MKR T# RAPID REBOOT)	Rapid Reboot Alarm	Critical
Configuration Change Trap	Configuration Change	Info
System Health Trap	System Health	Critical
Low Auxiliary Power (LOW AUX POWER)	Low Auxiliary Power A	Warning
No Auxiliary Power (NO AUX POWER)	No Auxiliary Power Al	Critical
Power Supply PCB Communication (POWER PCB COMM)	Power Supply PCB C	Warning
Power Supply PCB Drycontact	Power Supply PCB Di	Info

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

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

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

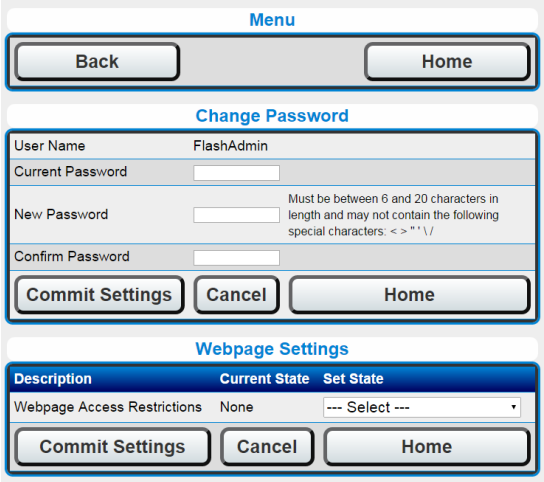
For SNMP V2C only, the trap community string may also be modified. The default value is “public”.

SYSTEM INFORMATION

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

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”.

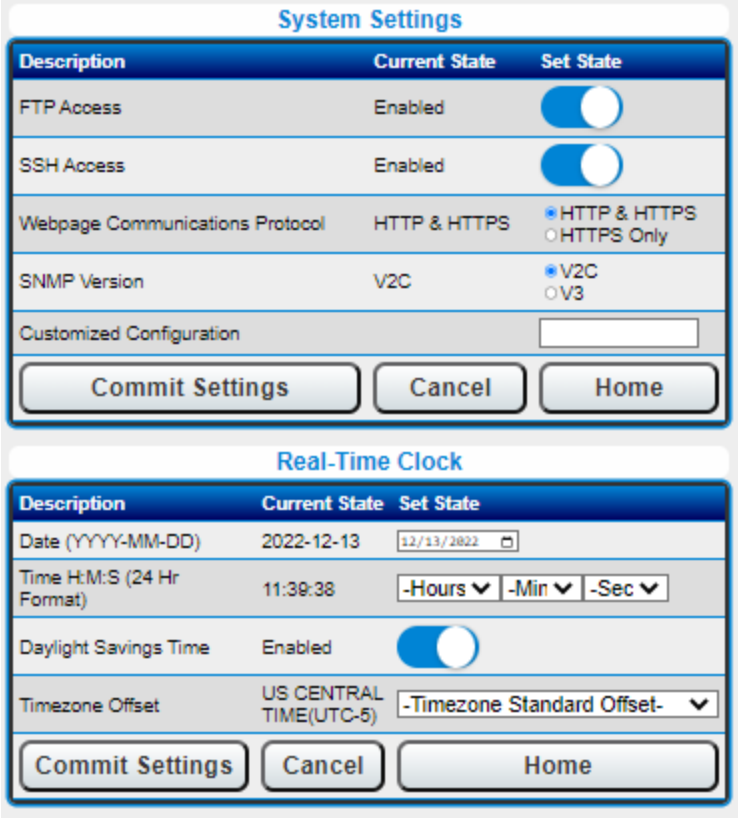
Note: Only use private internet connections to connect to the webpage. Using public internet connections are susceptible to unauthorized access of the webpage or SNMP interface. Please refer to Flash Technical Bulletin “Vulnerability of Self-Monitoring via Public Internet” for more information about 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.

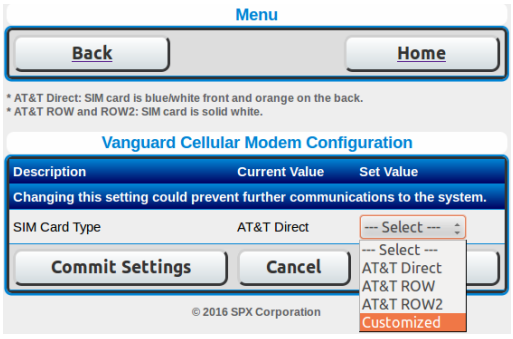
SSH access may also be disabled on this page. As well as restricting access to these web pages to HTTPS only.

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 Config (page 91) for additional information.



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

SECTION 5 – MAINTENANCE AND TROUBLESHOOTING

SAFETY

Warning! Read the Personal Hazard Warning (page 6) now. Disconnect primary power before opening enclosures.

Work safely, as follows:

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

PREVENTIVE MAINTENANCE

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

1. Verify that moisture has not accidentally entered the equipment through gaskets or seals, or collected inside as condensation.
2. Verify that all drain holes are clear.
3. Check terminal blocks and relays for corrosion or arcing. Clean or replace any component that shows evidence of high-voltage damage.
4. Check all electrical connections for tightness and verify the absence of corrosion or electrical arcing.
5. Clean the outside surface of the lens with liquid detergent and water. Wipe it gently with a soft cloth or paper towel.
6. Due to the extreme temperatures that may be present in the field, 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 372 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 122).

Table 5-1 – Troubleshooting – Initial Inspection

Step	Check/Test/Action		Action
1.a	Is the flashhead flashing?	Yes No	Go to Step 1.b Go to Step 2.a
1.b	Is the failure related to a connected tier of L-810 side markers (marker alarm)?	Yes No	Go to Step 4.a Go to Step 1.c
1.c	Are alarms present on PCB1?	Yes No	Review Tables 1-3 and 3-3. System okay.

Table 5-2 – Troubleshooting – System Voltage

Step	Check/Test/Action		Action
2.a	Is input power applied? Measure at TB1 terminals L1 & L2. Check Circuit Breaker Flag Indicator if green OFF or red ON.	Yes No	Go to Step 2.b Correct problem.
2.b	Is power being output from TB1? Measure at TB1 Circuit Breaker terminals (both poles).	Yes No	Go to Step 2.c Check / Replace Circuit Breaker. Replace VR1.
2.c	Are any of the Status and Alarm Indicators (LEDs or OLED display) lit on PCB1?	Yes No	Go to Step 2.g Go to Step 2.d
2.d	Is the correct voltage present on PCB1? Measure at P2 terminals 1 & 2 (12 VDC).	Yes No	Replace PCB1. Go to Step 2.e
2.e	Are the operational status LEDs lit on PCB4? Note: Verify that the input power switch, located on PCB4 (AC units only), is in the “On” position. See Figure 2-33 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? With input power removed, disconnect the flashhead cable, apply power and measure as described previously at TB2.	Yes No	Inspect flashhead cable, flashhead and marker interface box (if installed) for damage. Check PCB2, PS1 and PS2 for damage. Replace as necessary.

Table 5-3 – Troubleshooting - Flashhead

Step	Check/Test/Action		Action
3.a	Is the correct voltage present in the flashhead? Measure at flashhead terminal block DC+ & DC- (58 VDC).	Yes No	Go to Step 3.b Inspect flashhead cable and connections.

	Note: If a marker tier is connected between the SC 372 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.		
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- (58 VDC)	Yes No	Go to step 3.c Replace Surge PCB located in the flashhead.
3.c	Are the two LEDs lit on the core board? View through the clear polycarbonate cover on the bottom of the light engine assembly.	Yes No	Replace the light engine assembly. Inspect the wiring harness between the Surge PCB and the Core PCB for loose connection or damage. Repair/replace if necessary. Replace the Core PCB if no problem is found with the wiring harness.

Table 5-4 – Troubleshooting – L810 Side Markers (SC 372 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- (58 VDC).	Yes No	Go to Step 5.b Check flashhead cable between SC 372 and Marker Interface Box.
5.b	Are any marker alarm indicators (1-4) lit on the marker interface PCB located in the marker junction box?	Yes No	Go to Step 5.e Go to Step 5.c
5.c	Is the correct voltage present on J5? Measure at J5 DC+ & DC- (58 VDC).	Yes No	Go to Step 5.d Check/repair wiring between TB1 and the marker interface PCB.
5.d	Are the operational voltage status LEDs lit on the marker interface PCB? See Figure 1-8 for location.	Yes No	Go to Step 5.e Replace the marker interface PCB.
5.e	Is the correct voltage present on the output(s) for the failed marker(s)? Measure DC+ to DC- (24 VDC) on the marker output(s) (J1 – J4) corresponding to the Marker Alarm (1-4).	Yes No	Check wiring for an open connection. Replace LED marker fixture(s) if no wiring fault is found. Go to Step 5.f

5.f	Is the correct voltage present on the output(s) for the failed marker(s) with the marker connections (J1-J4) disconnected from the marker interface board? With the system powered down, unplug the marker connections (J1 – J4) from the marker interface board. Apply power to the system and measure DC+ to DC- (24 VDC) on the marker output(s) (J1 – J4).	Yes No.	Check marker output wiring for a possible short. Replace marker fixture(s) and wiring if necessary. Replace the marker interface PCB.

Table 5-6 – Troubleshooting – GPS Synchronization

Step	Check/Test/Action		Action
6.a	Are there any obstructions that could block the GPS antenna from receiving satellite signal?	Yes No	Remove obstruction(s) or relocate the GPS antenna. Go to step 6.b.
6.b	Is the “Ant. Open” or “Ant. Short” LED lit on GPS PCB? Both LEDs are located in the GPS board (see GPS Sync Kit page 23).	Yes No	Inspect antenna cable. Replace cable and/or antenna if necessary. Go to Step 6.c
6.c	Does “GPS Comm.” show “Fault”? Navigate through the Information Display to “GPS” in the “Local Diagnostics” menu (See Section3).	Yes No	Replace PCB 3 Go to Step 6.d
6.d	Are at least 3 satellites visible to the controller? Navigate through the Information Display to “GPS” in the Local Diagnostics menu (See Section3).	Yes No	Replace PCB3 Reposition antenna.

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

COMPONENT REMOVAL AND REPLACEMENT

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

Important! Review the Safety information (page 119) before removing or replacing any component.

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

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

SECTION 6 – RECOMMENDED SPARE & REPLACEABLE PARTS

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, 7 a.m. to 7 p.m. CT.

Emailing a completed RMA request form to FlashSupport@spx.com can also start the process on sites not requiring detailed troubleshooting. 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 126): “SC 372 (AC)” lists the major replaceable parts for the SC 372.
- Table 6-2 (page 128): “PC 372 (AC)” lists the major replaceable parts for the PC 372.
- Table 6-3 (page 128): “FH 372” lists the major replaceable parts for the FH 372.
- Table 6-4 (page 128): “Marker Interface” lists the major replaceable parts for the Marker Interface box.
- Table 6-5 (page 129): Lists the part numbers for additional or optional system parts that are not illustrated in the component diagrams.

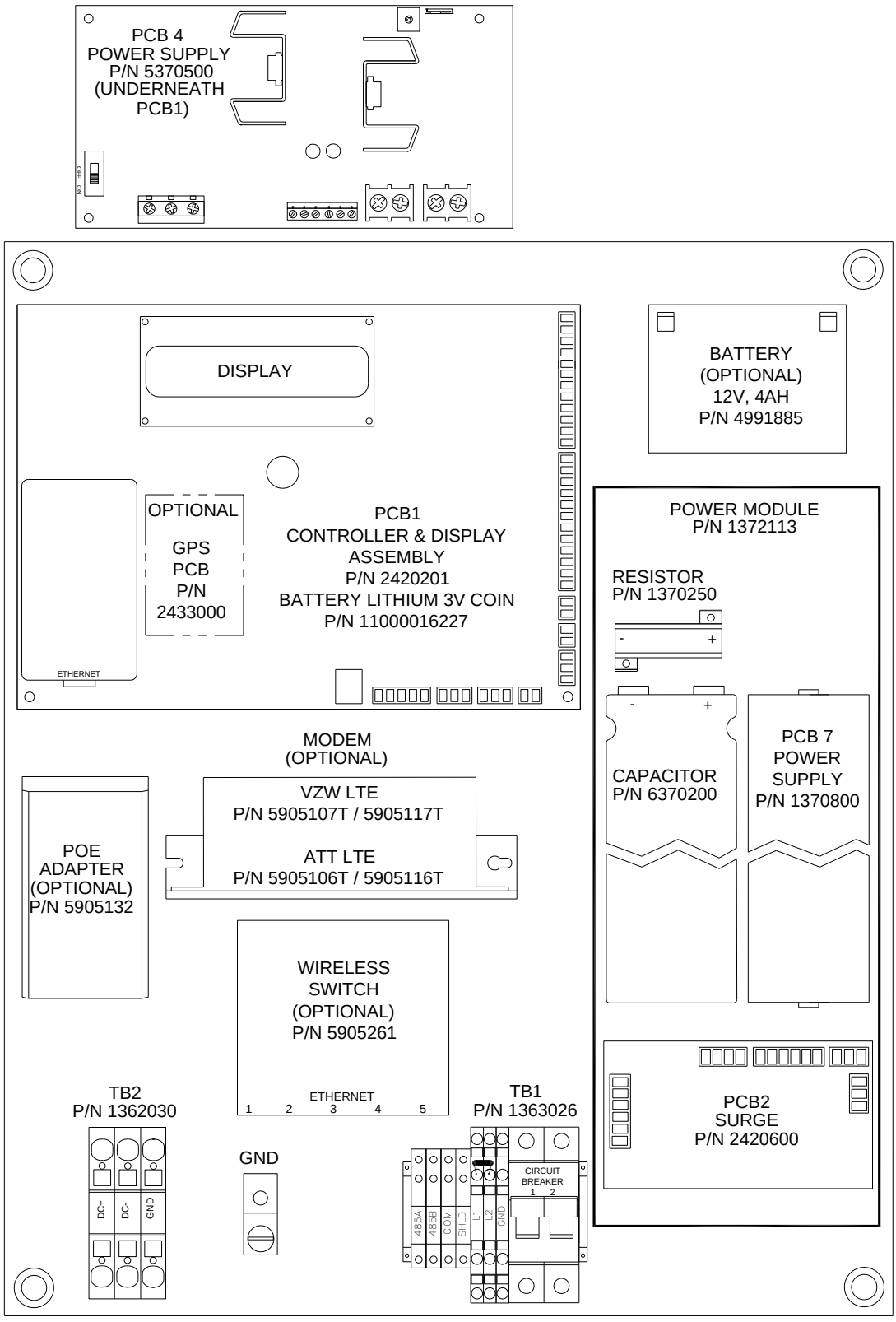


Figure 6-1 – SC 372 (AC) Component Locations

Table 6-1 – SC 372 (AC) Replacement Parts

Reference	Description	PN
PCB 1 Assembly	PCB CONTROL SC 372X w/CPU & DISPLAY	2420201T
PCB 2	PCB SURGE SC 372X [1]	2420600T
PCB 4	POWER SUPPLY 12VDC 2.5A	5370500T
PCB 7	POWER SUPPLY	1370800
CAPACITOR	CAP 230,000MF 75VDC	6370200
RESISTOR	RESISTOR 330 OHM 50W	6370250
POWER MODULE	REPLACEMENT POWER SUPPLY MODULE	1372113
BATTERY	BATTERY 12V[2], 4Ah	4991885
	BATTERY LITHIUM 3V COIN 12.5MM[3]	11000016227
MODEM	MODEM WIRELESS VERIZON LTE	5905117T
	MODEM WIRELESS AT&T LTE	5905116T
Wi-Fi ANTENNA	2.4 GHZ HIGH POWER ANTENNA[4]	5905131
POE	POWER OVER ETHERNET (POE) INJECTOR	5905132
WIRELESS SWITCH	SWITCH 5 PORT GIGABIT	5905261
TB1	TERMINAL BLOCK INPUT POWER SC 372D/W/R	1363026
TB2	TERMINAL BLOCK ASSY SC 372D/W/R & FH 370D/W	1362030
VR1	VARISTOR 230/240V METAL OXIDE[1]	6901081

1. Recommended as a Spare Part.
2. Due to the extreme temperatures that may be present in the field, it is recommended to replace the backup battery every 1-2 years as part of a periodic maintenance program.
3. Flash Technology recommends replacing the coin battery every 5 years as part of a periodic maintenance program.
4. Antenna is mounted externally.

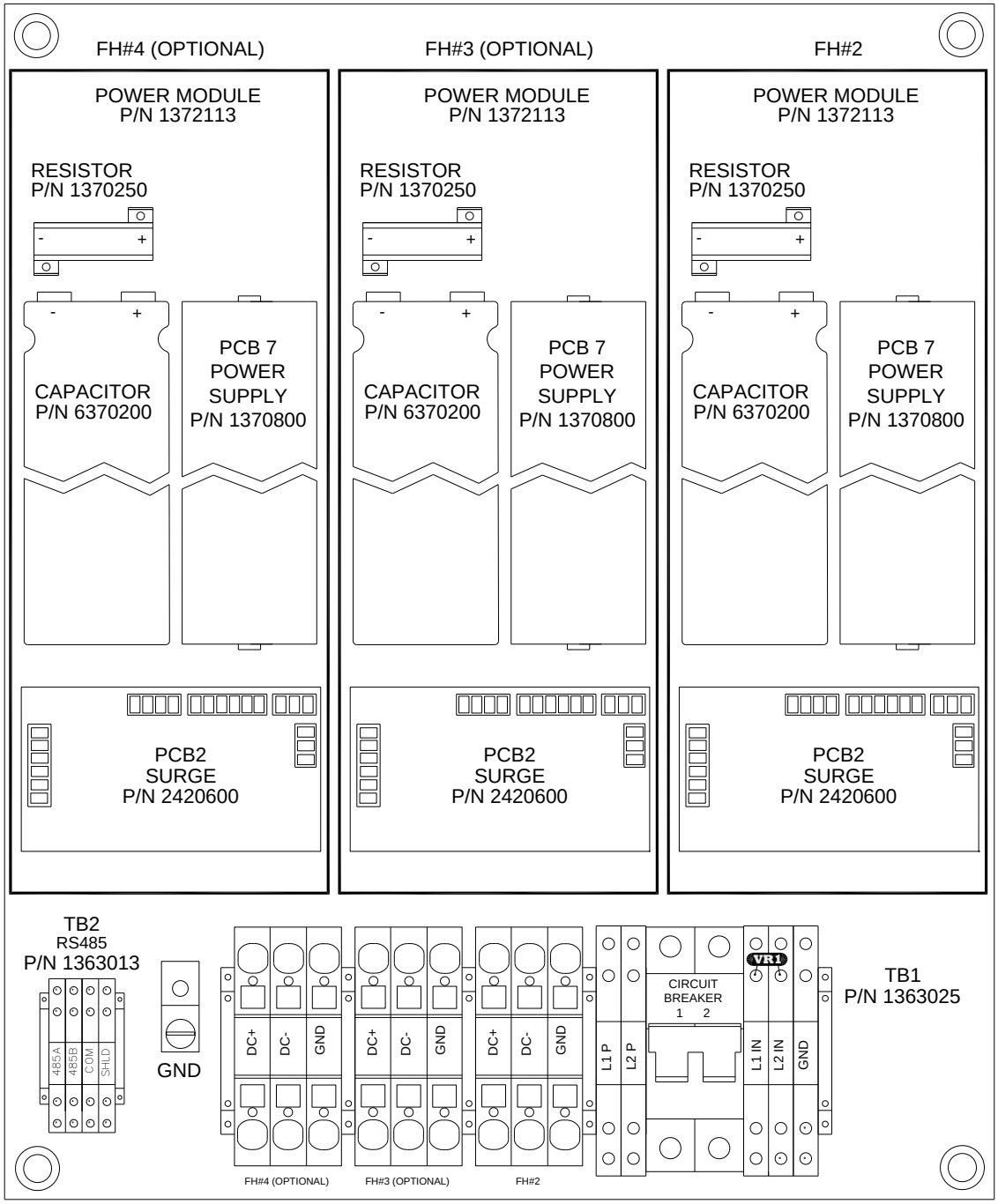


Figure 6-2 – PC 372 (AC) Component Locations

Table 6-2 – PC 372 (AC) Replacement Parts

Reference	Description	PN
PCB 2	PCB SURGE SC 372X[1]	2420600T
PCB 7	POWER SUPPLY	1370800
CAPACITOR	CAP 230,000MF 75VDC	6370200
RESISTOR	RESISTOR 330 OHM 50W	1370250
POWER MODULE	REPLACEMENT POWER SUPPLY MODULE	1372113
TB1	TERMINAL BLOCK INPUT POWER SC 372D/W/R	1363025
TB2	RS 485 TERMINAL BLOCK	1363013
VR1	VARISTOR 230/240V METAL OXIDE[1]	6901081

1. Recommended as a Spare Part.

Table 6-3 – FH 372 Replacement Parts

Reference	Description	PN
FH 372d	L-864/L-865, L-866/L-885 LED FLASHHEAD	1372100
FH 372d	PCB SURGE FH 372d/w/r[1]	2162500T
FH 372d	PCB CORE BOARD FH 372d	2162002T
FH 372d	TERM BLOCK ASSY FH/SC CABLE	1362030
FH 372d	TERM BLOCK ASSY RS485 CABLE	1363013

1. Recommended as a Spare Part.

Table 6-4 – Marker Interface Replacement Parts

Reference	Description	PN
PCB1	MARKER INTERFACE PCB	2422300T
TB1	TERM BLOCK ASSY MARKER JUNCTION BOX	1363020
MKR 372	MARKER KIT 1-MKR 372 DC L810 FAA IR	1901010

Table 6-5 – System Replacement Parts

Reference	Description	PN
FTS 372 D/W/R	INSTALLATION KIT, FTS 370 - SINGLE BCN	1370990
FTS 372 D/W/R	CABLE TC-ER RATED 10 AWG POWER & COMM[1]	4372100
FTS 372 D/W/R	CABLE TC-ER RATED 8 AWG POWER & COMM[2]	4372080
FTS 372 D/W/R	CABLE TC-ER RATED 6 AWG POWER & COMM[3]	4372060
SC 372 D/W/R	PHD 516 PHOTODIODE W/20' PIGTAIL	1855516
SC 372 D/W/R	GPS KIT	1370285
SC 372 D/W/R	ANTENNA GPS WITH GASKET[4]	6903295
SC 372 D/W/R	ANTENNA CABLE VANGUARD GPS 50FT[5]	6903293
SC 372 D/W/R	KIT, ANTENNA MOUNTING BRACKET[6]	1905355
SC 372 D/W/R	KIT, PANEL MOUNTING ADAPTER (OPTIONAL)	1905036

[1] Maximum cable length between SC 372 and FH 372 is 350 ft using PN 4372100
[2] PN 4372080 is required for cable lengths between 376 ft. and 600 ft. (maximum)
[3] PN 4372060 is required for cable lengths between 601 ft. and 850 ft. (maximum)
[4] Part included with PN 1370285 GPS SYNC KIT
[5] Part included with PN 1370285 GPS SYNC KIT
[6] Part included with PN 1370285 GPS SYNC KIT