



SERIAL NUMBER



FTW 171-3 / FTW 172-3 MSAT SDT-5000

**Wireless Monitoring System
Reference Manual
Part Number 7911713MSAT**

Front Matter

Abstract

This manual contains information and instructions for installing, operating and maintaining the FTW 171-3 MSAT and FTW 172-3 MSAT Wireless Monitoring Systems.

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Warranty

Flash Technology warrants all components, under normal operating conditions, for 1 year.

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Section 1 – Introduction

Introduction

This manual covers in detail the following two products: the FTW 171-3 MSAT and the FTW 172-3 MSAT.

The FTW 17X-3 wireless monitoring unit utilizes a Geo-stationary orbital satellite with three (3) distinct beams, namely West, Central and East, that service the continental United States. Each Wireless Monitoring Unit has been programmed from the factory to operate within a specific beam.

The FTW 171-3 MSAT provides wireless monitoring through the use of four (4) dry contact inputs. The unit also monitors site power. Dry contacts are typically alarm relays provided by equipment for external monitoring of alarm conditions. Each input of the FTW 171-3 MSAT can be configured by the NOC to alarm on either open or closed status. **Alarm on open is preferred for fail safe monitoring.**

The FTW 172-3 MSAT functions in the same manner as the FTW 171-3 MSAT but with the added benefit of RS-485 communication with Flash Technology lighting systems that are equipped with PCB 4747 or PCB 9038.

Alarm and communication monitoring is handled by the Flash Technology National Operations Center (NOC).

Additionally, the FTW 171-3 MSAT is RS-485 capable but not RS-485 enabled when shipped from the factory. Enabling the RS-485 on a FTW 171-3 MSAT will change the wireless monitoring unit to a FTW 172-3 MSAT. If interested in upgrading, call the NOC at 1-800-821-5825 for assistance on this enhancement to your system.

Description

The component layout and internal wiring of the units are shown in Figure 1-1. The dry contact inputs are located on J2 of PCB 9039 as shown in Figure 4-5.

Specifications

Physical

12H x 10W x 6D inches (Internal)
10 lbs.

Electrical

AC Voltage	120 VAC, 60 Hz
Power	36VA

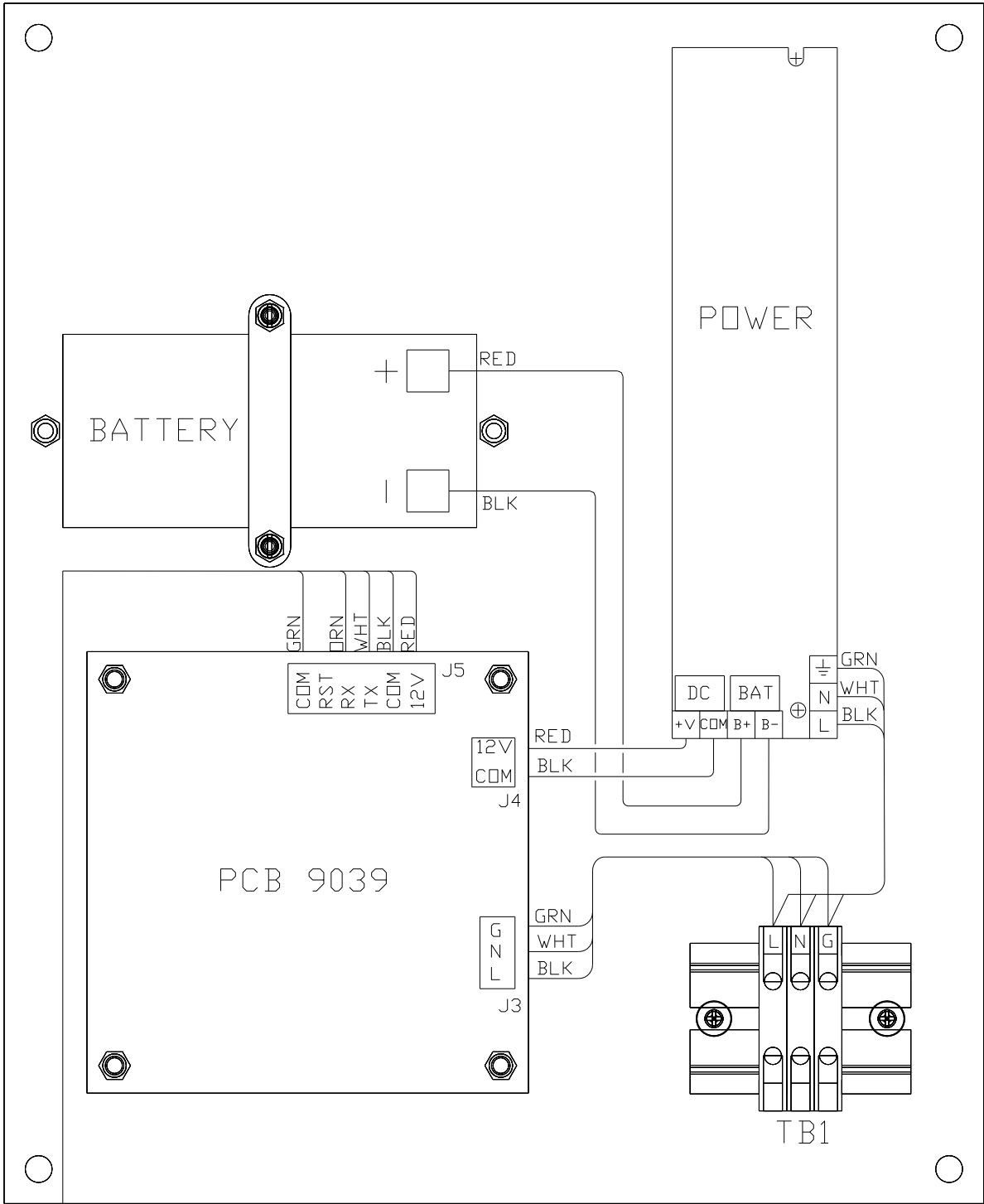


Figure 1-1 – FTW 171-3 / 172-3 MSAT Internal Wiring and Component Layout

Section 2 – Initial On-Site Check

Unpacking

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

Section 3 – Safety Precautions

Read and understand the entire manual and follow the safety instructions



WARNING!

1. Replace fuse with same type and rating for protection against fire and damage.
2. The *SDT 5000* is a Radio Frequency (*RF*) generating device. Do not operate the unit when anyone is in the vicinity noted in the *Safety Information* section of this guide. This could result in personal injury.
3. Do NOT operate the *SDT 5000* unit in areas where explosives are in use as the *RF* frequency could interfere with the operation, causing hazardous conditions. Do NOT operate the *SDT 5000* unit in areas where two-way radio communications is prohibited.
4. For safety purposes, use caution when determining the *SDT 5000* installation location.



CAUTION!

1. READ THIS MANUAL IN ITS ENTIRETY!

2. Keep all original Packing Materials.
3. Follow the instruction enumerated in the *Installation Section* of this guide to ensure proper hardware installation.
4. Ensure that the *SDT 5000* is installed in a location that will NOT affect the *RF* transmission.
5. Pay close attention to the electrical power installation requirements described in this guide.



Safety Information

Read and understand the complete *Installation Guide*, including the *Safety Precautions*, prior to using the *SDT 5000* Modem.

The *SDT 5000* is a radio unit used to receive and transmit data. When in operation, the *SDT 5000* transmits and receives *RF* signals to and from a Geostationary orbital satellite.

Follow appropriate guidelines when installing the *SDT 5000* near hazardous locations.

- As defined in *ANSI/ISA Standard S82.01, Electric and Electronic Test, Measuring, Controlling, and Related Equipment, General Requirements*.
- All electrical wiring and grounding must comply with *National Electrical Code* requirements and local inspection authorities.
- Metal enclosures and exposed metal parts of electrical instruments must be grounded in accordance with OSHA rules and regulations pertaining to *Design Safety Standards for Electrical Systems, 29 CFR, Part 1910, Subject S, dated 16 April 1981* (OSHA rulings agree with the *National Electric Code*).

- The unit must be installed in an unclassified area outside the Class I, Division 2, hazardous classified location as defined by ANSI/API RP 500 – 1998 *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 and Division 2*.
- The enclosure is designed so it is sealed at all times to protect from accidental electrical shock.

The *SDT 5000* must be used in accordance with the safety guidelines stated in this document. Failure to comply could result in physical harm and can be a hazard to the health of the operator of this unit.

- A person is blocking line-of-sight to the satellite during transmission. The satellite is 101° longitude and the antenna will point in that direction at all times while in operation.
- A person must be exposed to transmissions, as described above, for a continuous period of at least thirty minutes to exceed recommended exposure limits set by the *Federal Communications Commission*.



Important Safety Notice

The *SDT 5000* satellite radio emits radio frequency (*RF*) energy when transmitting. Operators should maintain a safe distance from radio when transmitting. The safe distance of 36 inches is measured from the center of the antenna beam with respect to the *ANSI/IEEE C95.1-1992* standard. The *SDT 5000* uses a directional antenna. In the case of this antenna, the 36-inch distance should be maintained under the following conditions:

- The antenna is powered on and transmitting. The *SDT 5000* transmits only when the remote terminal unit (*RTU*) sends messages to the host computer. These transmission periods are typically less than 10 seconds. Otherwise, the *SDT 5000* remains in receive mode or sleep mode and does not emit *RF* energy.

Section 4 – Mounting and Installation

Mounting

FTW17X-3 MSAT

The base of the unit has four (4) mounting feet as shown in Figures 4-3a and 4-3b. Mounting hardware is not included.

SDT 5000

The antenna mount must support the antenna weight and wind force created by the nominal wind speeds for that location.

An “unobstructed line of sight” from the antenna to the satellite is essential for reliable communications.

Mount the antenna as far away from any noise producing sources as possible. *RF* interference can originate from any number of unexpected sources such as high-tension lines, electrical and radio equipment and telecommunication towers. When installed and properly maintained next to or in an existing structure, ensure antenna is well away from air conditioners, electrical motors or other electrical devices.

Site Selection

Your *SDT 5000* assembly has been thoroughly tested and designed for use in rugged weather conditions. However, care and attention is still required for a proper installation. Select a site with a clear unobstructed line of sight to the satellite.

The *SDT 5000* is environmentally sealed, so it may be mounted directly outdoors. The unit may be installed indoors behind a glass window, provided there is a line of sight from the antenna to the satellite through the window, and the window does not have a coating that reflects *RF* energy.

The *SDT 5000* was tested and certified to operate in Class 1, Div. 2, Groups C&D hazardous locations.

Pre-Installation Considerations

SDT 5000

You should perform a pre-installation evaluation before installing any *SDT 5000* components. A pre-installation evaluation will provide information about how and where to install the *SDT 5000* and will help identify potential installation issues. During the pre-installation evaluation, you should estimate available space for component placement, cable routing and inspect the location to determine the most suitable area for an antenna installation. After completing a pre-installation evaluation, you should know where to locate components, how to route cabling and what additional mounting accessories, wiring and cabling conduits will be required for the installation.

General Considerations

Check for obstructions at the site below ground level when digging holes for the units mounted on poles.

Stay at least 36-inches away from an operating antenna when you are above the level of the antenna base.

Do not remove the antenna cover: removing the antenna cover will void the product warranty.

Do not paint the antenna: paint on the antenna will void the product warranty. Paint may also interfere with signal transmission or reception.

Installation

FTW 171-3 and FTW 172-3

Connect the equipment to be monitored via dry contact inputs as shown in Figure 4-5. A label has been provided on the inside cover of the unit to record each input, up to four (4), that is connected. Figure 4-2 depicts the dry contact input label.

RS-485 Setup (FTW 172-3 Only)

Connect the equipment to be monitored via RS-485 as shown in Figures 4-4. Figure 4-5 shows the layout of the PCB 9039 board including the location of jumpers JP1 and JP2. If the PCB 9039 Modem Interface has configurable headers and shunts at JP1 and JP2, refer to Table 4-1 for the proper configuration of these jumpers. If the PCB 9039 has soldered-in wires at JP1 and JP2, no configuration of these jumpers is necessary.

SDT 5000

Wireless Matrix recommends placing other antennas (private radio or cellular) at least 3-feet from the antenna mount. A typical pole mounted antenna is displayed in Figure 4-6.

Please refer to “Appendix A” for a listing of materials shown in Figure 4-6 that are supplied and not supplied with the *SDT 5000*.

Attaching to a Free Standing Pole

1. An in-ground free standing pole installation will consist of a 10 to 12-foot by 2 3/8 or 2 7/8-inch schedule 40

pipe installed in a hole filled with concrete.

2. Identify the installation site keeping in mind that the location must be outside any hazardous area and “unobstructed line of sight” to the satellite is essential.

3. Dig the hole at least 2-feet below the frost line where possible.

a. The top of the concrete should be at least 6-inches below the frost line.

b. The hole should be at least 12-inches in diameter.

4. In high wind areas, install a bolt or pipe in the bottom portion of the pole. This should prevent the pole from turning in the concrete pad causing misalignment of the antenna or solar panels and damage to the power-data cable.

5. Allow concrete to harden before proceeding with installation of antenna or solar panels.

6. Use proper sized pole brackets/U-bolts to affix antenna to pole.

7. Secure the cable with cable clamps or ties every 12 to 18-inches or run cable inside conduit or *Seal-Tite*. Avoid tight bends and kinks in the cable and grounding cable. The recommended tightest allowable bend radius is 2-inches.

Attaching to an Existing Structure (Meter Shed or Compressor Building)

1. Use two 1.5-inch Kindorf or equivalent channel, bolted to shed or building support struts. One to be installed near the bottom of the structure and the second to be installed near the top of the structure.

2. Use Kindorf or equivalent pipe brackets (for 2 3/8 or 2 7/8 inch pipe) to affix pole to Kindorf channel.

3. Use proper sized pipe brackets (for 2 3/8 or 2 7/8 inch pipe) to affix antenna base to pole.

4. Secure the cable with cable clamps or ties every 12 to 18-inches or run cable inside conduit or Seal-Tite. Avoid tight bends and kinks in the cable and grounding cable. The recommended tightest allowable bend radius is 2-inches.

Wiring

Flash Technology has provided the cable and pre-attached it to the satellite modem; you must route the cable and connect it to the FTW17X-3 MSAT unit. The cable contains six (6) wires, five of which must be connected to J5 on PCB 9039. Refer to Figure 1-1 and 4-5. The blue wire will be used to aim the antenna.

Connect 120 VAC to the terminal block as shown in Figure 4-1. Once power is on, wait 30 seconds for the SDT 5000 to power up.

Aiming the Antenna

When the SDT is first powered up it provides a voltage proportional to the receive signal strength. The voltage is indicated on the receive signal strength indicator (RSSI) wire (Blue on supplied cable, Alpha 5386C).

Connect the positive lead of the voltmeter to the RSSI wire and the negative lead to a ground wire (black or green on J5).

1. Position the meter so the display is easy to view.
2. 30 Seconds after the SDT powers up. The RSSI voltage will rise and fall as the SDT is rotated.
3. Position the SDT so the RSSI voltage is at its maximum.

4. Rotate the SDT over a wide angle to ensure the maximum RSSI voltage has been found. The RSSI should be greater than 1.2 V.
5. Once an optimal RSSI voltage is achieved, secure the bolts that lock the position of the SDT.

When the above aiming is completed the blue wire should be tied back and wrapped with electrical tape. Remove power from the FTW17X-3 MSAT unit and continue with the installation.

Orientating the Antenna Using a Compass

Before powering up the antenna, it is important to orient the antenna in the general direction of the satellite. Failure to point the antenna in the general direction of the *SDT 5000* will cause the unit to go into a *Channel Search*, which could take as long as fifteen minutes to complete. Steps to point the antenna using the compass provided are described below.

1. Refer to the *Antenna Positioning Map* (see Figure 4-7) for the correct positioning of the *SDT 5000*.

⇒ NOTE:

The map shown in Figure 4-7 may vary 5 to 10 degrees, in regards to *Elevation* and *Azimuth*, depending on the specific location. It is provided solely as an aid to assist in positioning the *SDT 5000*.

2. Find the general installation location on the Antenna Positioning Map and make note of the specific *Azimuth* (150-240 Degree Range) and *Elevation* (30-60 Degree Range). Using the compass provided with the installation guide, find a flat surface and line up Magnetic North with the correct end of the Compass Hand. Once the hand is fixed on North, find the location's *Azimuth* on the compass face and position the *SDT 5000* in the same

direction. Now that the *SDT 5000* is facing in the correct direction to satellite, it is necessary to adjust the Antenna's *Elevation*. Using the Antenna Positioning Map, find your *Elevation* and adjust accordingly. Line of sight is necessary for operation.

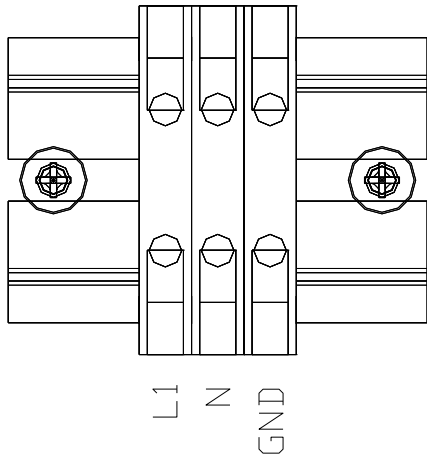
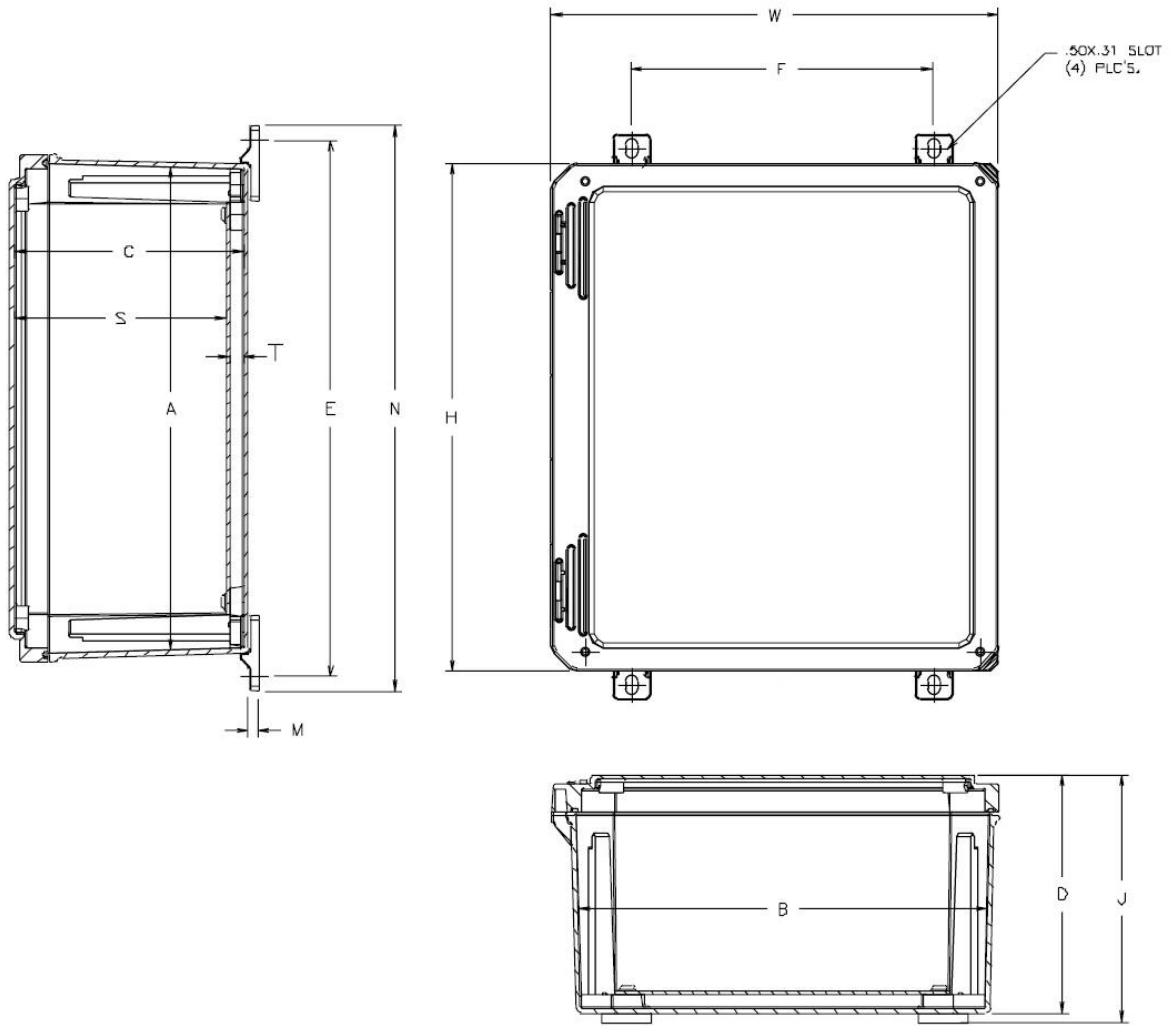


Figure 4-1 – AC Termination

DRY CONTACT INPUTS	
DESCRIPTION	ALARM (CIRCLE ONE)
1 _____	OPEN / CLOSED
2 _____	OPEN / CLOSED
3 _____	OPEN / CLOSED
4 _____	OPEN / CLOSED

Figure 4-2 – Dry Contact Input Label



H	W	D	A	B	C	S	T	E	F	N	J	M
13.45	11.83	6.31	12.69	10.69	6.06	5.60	0.38	14.18	8.00	14.95	6.56	0.25

Dimensions are in inches.

Figure 4-3a – Enclosure Mounting Footprint (Stahlin)

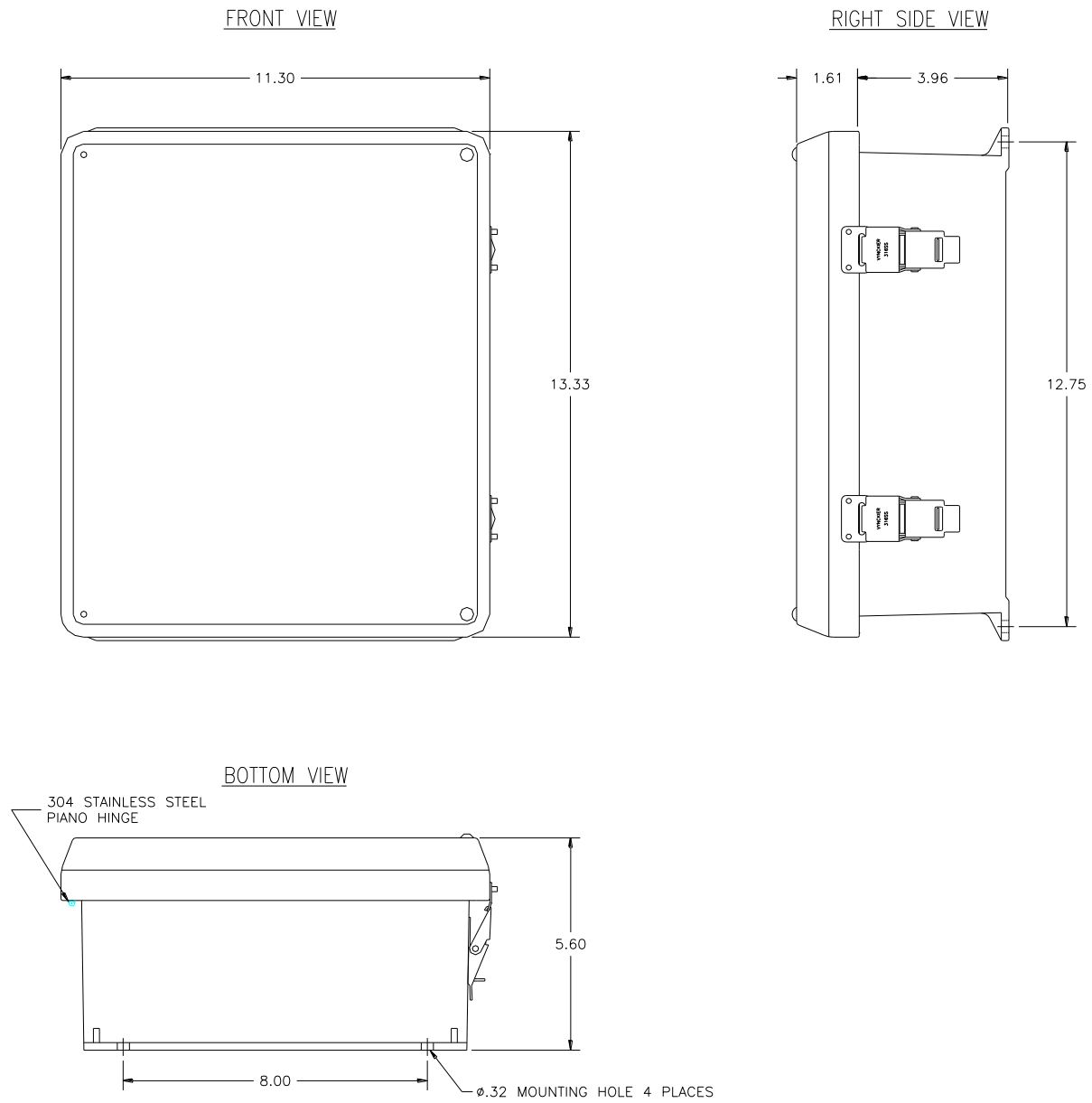


Figure 4-3b – Enclosure Mounting Footprint (Vynckier)

Table 4-1 – PCB 9039 Wireless Interface

Item	Description	Action
JP1	RS485PUP	Remove Shunt
JP2	RS485TERM	Install shunt on both pins

If the TTB in the last power converter in a chain has a PCB 4747, connect a 220 Ohm termination resistor at J9 terminals 1 and 2 on this TTB only. If the last power converter has a PCB 9038, refer to Table 4-2 below. All other power converters should have neither shunt installed.

Table 4-2 – PCB 9038 Medium Intensity TTB

Item	Description	Action
JP3	RS485PUP	Remove Shunt
JP4	RS485TERM	Only at the last power converter in a chain, install a shunt on both pins

Table 4-3 shown below describes the LED's that are present on the PCB 9039. The location of the LED's is shown in Figure 4-5.

Table 4-3 – PCB 9039 LED's

Item	Description
ACTIVE	Indicates that the modem has signal and it connected to the wireless network.
232RX	The RS-232 port is receiving data from the modem.
232TX	The RS-232 port is transmitting data to the modem.
485TX	The RS-485 port is transmitting data to the lighting system.
485RX	The RS-485 port is receiving data from the lighting system.
IN1	Dry contact input #1 is closed or shorted.
IN2	Dry contact input #2 is closed or shorted.
IN3	Dry contact input #3 is closed or shorted.
IN4	Dry contact input #4 is closed or shorted.

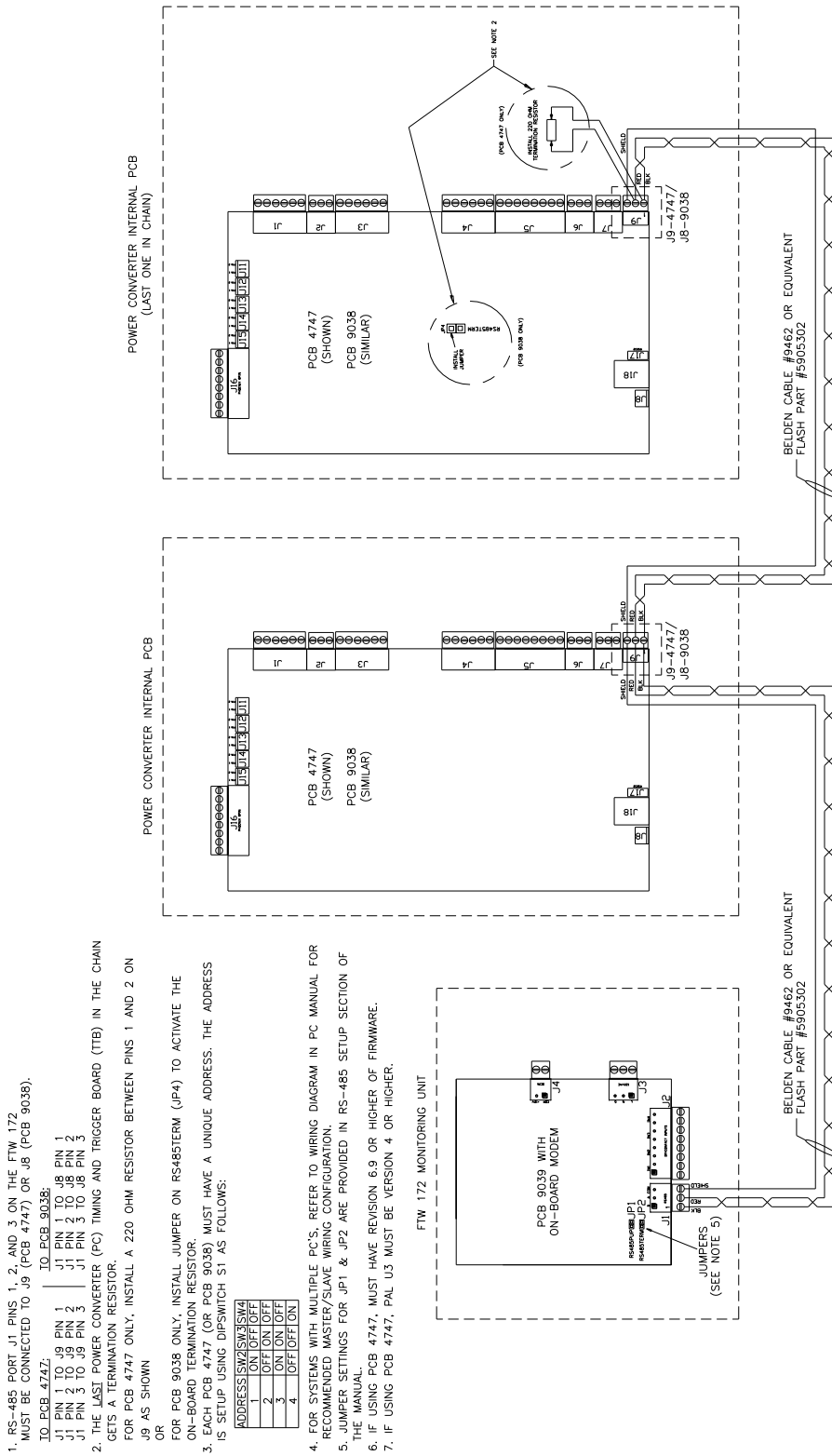


Figure 4-4 – RS-485 Installation

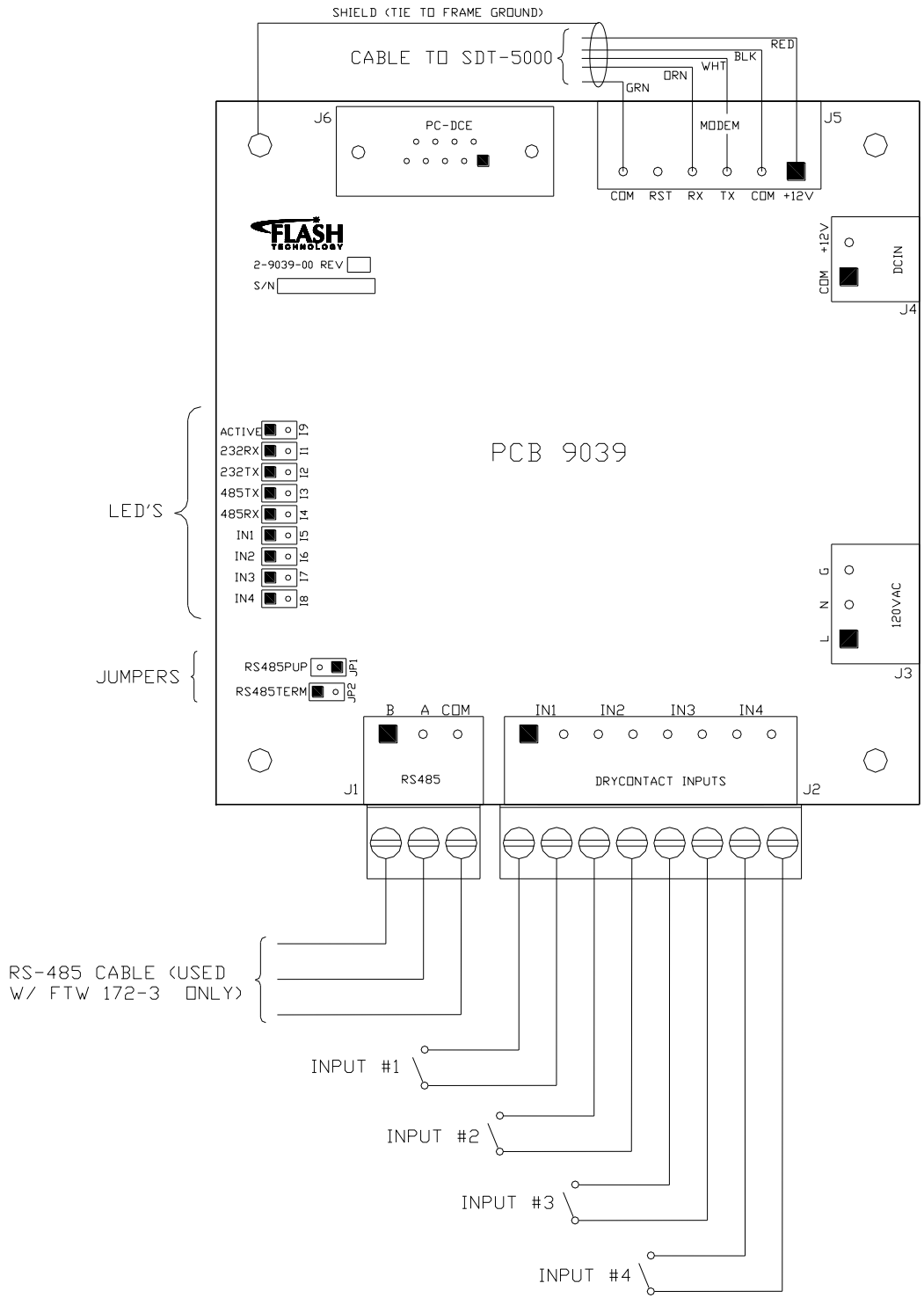


Figure 4-5 – PCB 9039 Layout and External Wiring

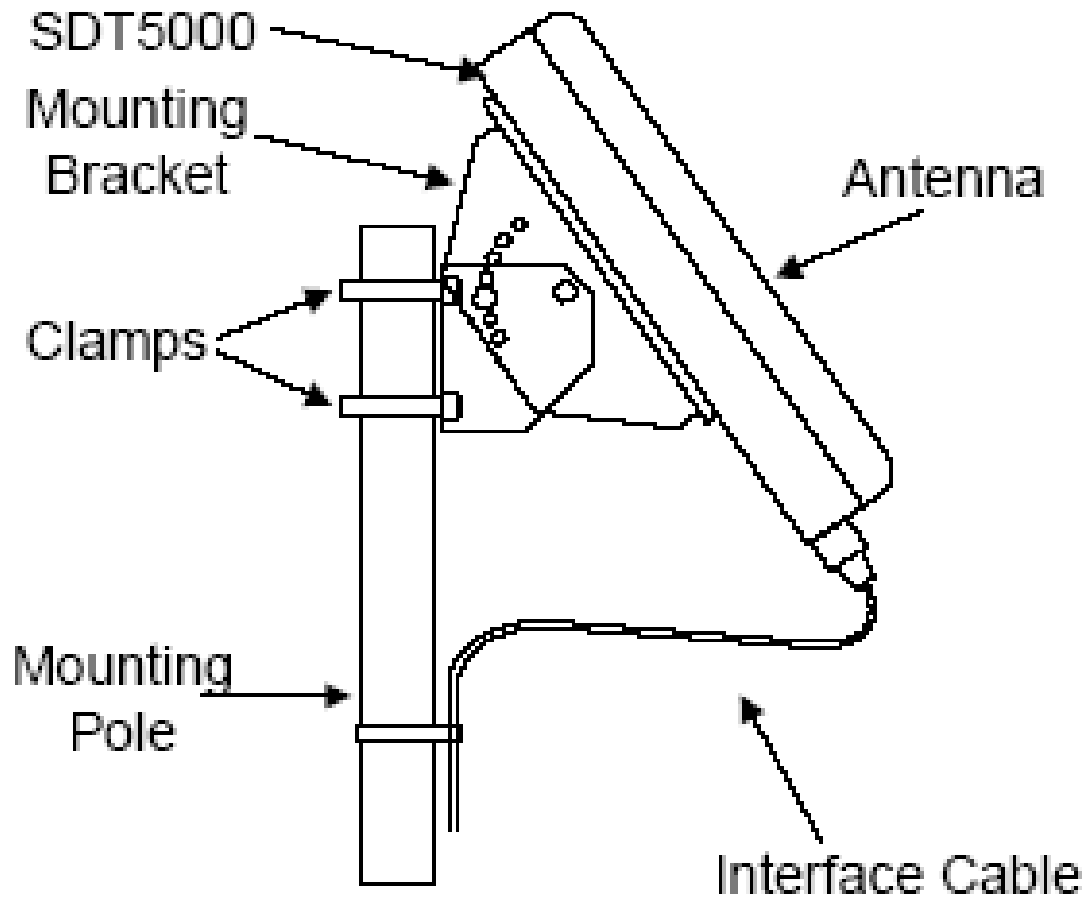


Figure 4-6 - Typical Pole Mounted Antenna

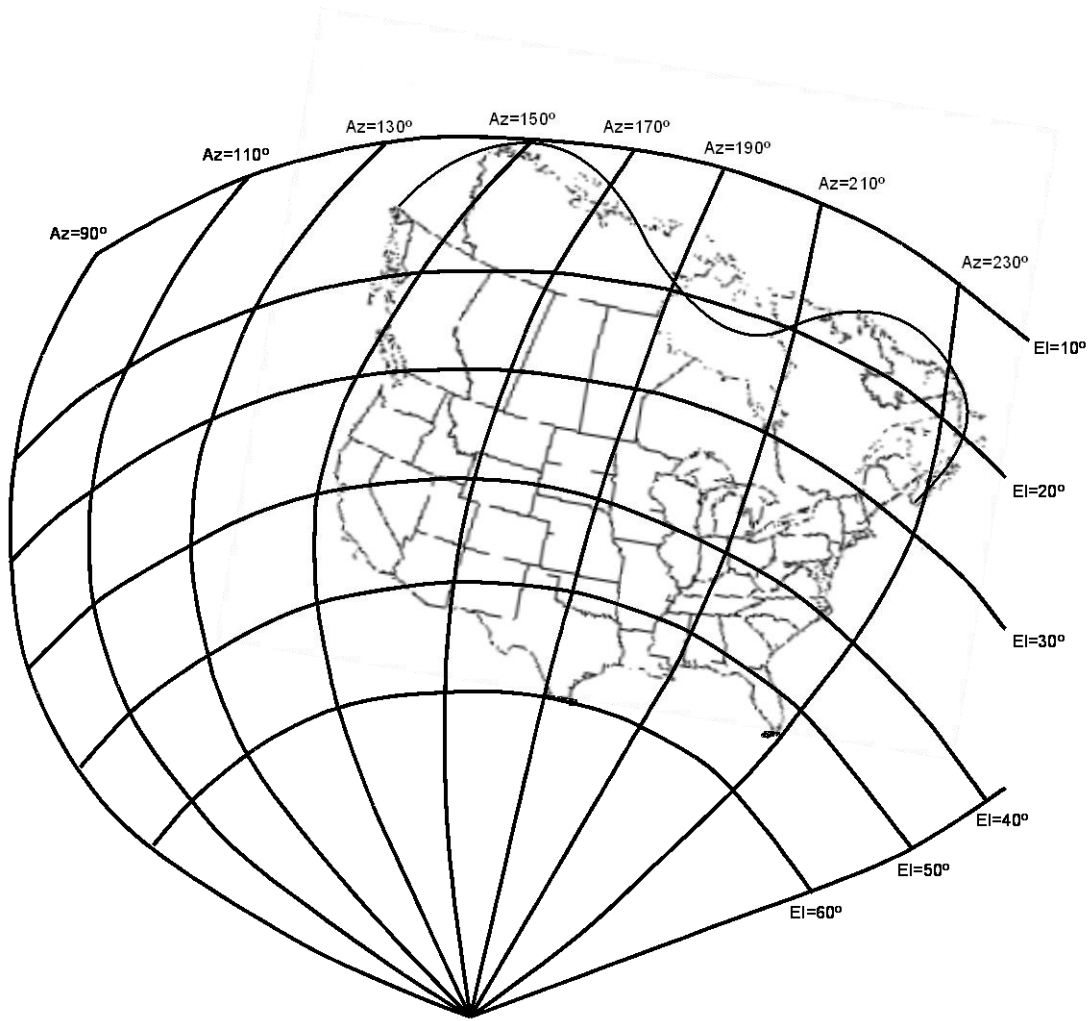


Figure 4-7 – Antenna Positioning Map with Azimuth and Elevation Degrees

Section 5 – Activation

Monitoring

Once the installation is complete, follow the procedure below to activate the service and begin monitoring:

1. Please be prepared to provide the following information:
 - The wireless address for this unit. See Figure 5-1. This label is located on the SDT 5000 antenna.
 - Your name, contact number and company.
 - If monitoring an FCC registered tower site, the site number and FCC number.
 - Descriptions of the items being monitored by each input.
2. Re-apply power to the equipment and observe the “Active” LED shown in Figure 4-5. The green LED should first blink when the unit is first powered on and illuminate solid when communicating with Flash Technology’s monitoring network. This process may take several minutes.
3. Connect the red wire to + (Positive) and the black wire to – (Negative) on the battery as shown in Figure 1-1.
4. Call 1-800-821-5825 to initiate monitoring while on-site. The NOC technician will request several tests to be performed to verify correct installation and operation of the system.
5. Please note that once the unit is powered and communication is established, it will automatically send a message to the NOC to initiate service and billing will begin.

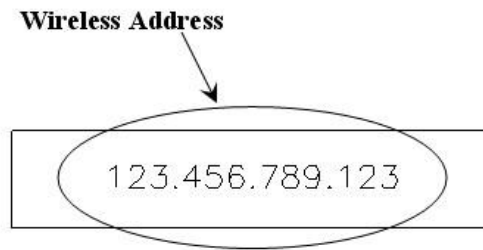


Figure 5-1 – Wireless Address

Section 6 – Recommended Spare & Replaceable Parts

Customer Service

Customer Service: (800) 821-5825

Telephone: (615) 261-2000

Facsimile: (615) 261-2600

Shipping Address:

Flash Technology
332 Nichol Mill Lane
Franklin, TN 37067

Ordering Parts

To order spare or replacement parts, contact customer service at 1-800-821-5825.

Table 6-1 – Replacement Parts

Reference	Description	Part Number
BATTERY	12V Battery	F4991875
POWER	Power Supply	11000002888
PCB 9039	Board, Modem Interface	F2903903
TB1	Terminal Block Assembly	F1903677
ANTENNA/MODEM	SDT5000 Kit EAST Beam	F1905246
ANTENNA/MODEM	SDT5000 Kit CENTRAL Beam	F1905247
ANTENNA/MODEM	SDT5000 Kit WEST Beam	F1905248
HARNESS	Harness, FTW 171/172, Input Power	11000002886
CABLE	Alpha 5386C	F4905233
CABLE	RS-485; Single Pair, 22 AWG, Red/Black	F5905302
CABLE	Dry Contacts; 4 Pair, 22 AWG, Red/Black	F5993101

Table 6-2 – System Upgrade (For FTW 171 ONLY)

Reference	Description	Part Number
SYSTEM	Upgrade FTW 171 to FTW 172	F1905228

Disconnecting Power

When removing power from the equipment, ensure that the red wire to the battery is disconnected first.

Return Material Authorization (RMA) Policy

IF A PRODUCT PURCHASED FROM FLASH TECHNOLOGY MUST BE RETURNED FOR ANY REASON (SUBJECT TO THE WARRANTY POLICY), PLEASE FOLLOW THE PROCEDURE BELOW:

Note: An RMA number must be requested from Flash Technology prior to shipment of any product. No returned product will be processed without an RMA number. This number will be the only reference necessary for returning and getting information on the product's progress.

Failure to follow the below procedure may result in additional charges and delays. Avoid unnecessary screening and evaluation charges by contacting Technical Support prior to returning material.

1. To initiate an RMA, customers should call Flash Technology's Network Operation Center at (800-821-5825) to receive technical assistance and a Service Notification number. The following information is required before a Service Notification number can be generated:

- Site Name/Number / FCC Registration number/ Call Letters or Airport Designator
- Site Owner (provide all that apply – owner, agent or subcontractor)
 - Contractor Name
 - Contractor Company
- Point of Contact Information: Name, Phone Number, Email Address, Fax Number and Cell Phone (or alternate phone number)
- Product's Serial Number
- Product's Model Number or part number
- Service Notification Number (if previously given)
- Reason for call, with a full description of the reported issue

2. The Service Notification number will then serve as a precursor to receiving an RMA number if it is determined that the product or equipment should be returned. To expedite the RMA process please provide:

- Return shipping method
- Purchase Order (if non-warranty repair)
- Shipping Address
- Bill To Address
- Any additional information to assist in resolving the issue or problem

3. A P.O. is required in advance for the replacement of product that may be under warranty. Flash will then, at its discretion issue a credit once the validity of the warranty has been determined.

4. A purchase order (P.O.) is also required in advance for all non-warranty repairs. NOTE: the purchase order is required prior to the issuance of the RMA number.

- If the P.O. number is available at the time of the call, an RMA number will be issued and the customer must then fax or email the P.O. with the RMA number as the reference, to ensure prompt processing.
- If the P.O. number is NOT available at the time of the call, a Service Notification Number will be given to the customer and should be referenced on the P.O. when faxed or emailed to RMA Rep.
- Flash will then, at its discretion repair or replace the defective product and return the product to the customer based on the shipping method selected.
- The customer may purchase a new product before sending in the existing product for repair. If Flash Technology determines the existing product is still covered under warranty a credit will be issued to the customer for the new product.

5. After receiving the Flash Technology RMA number, please adhere to the following packaging guidelines:

- All returned products should be packaged in a way to prevent damage in transit. Adequate packing should be provided taking into account the method of shipment.

Note: Flash Technology will not be responsible for damaged items if product is not returned in appropriate packaging.

6. All packages should clearly display the RMA number on the outside of all RMA shipping containers. RMA products (exact items and quantity) should be returned to:

Flash Technology
Attn: RMA #XXX
332 Nichol Mill Lane
Franklin, TN 37067

7. All RMA numbers:

- Are valid for 30 days. Products received after may result in extra screening and delays.
- Must have all required information provided before an RMA number is assigned.

Return to Stock Policy

- **Parts can be returned within 60 days of ship date and will be subject to a 25% restocking fee. Product must:**
 - Be in the original packaging
 - Not be damaged
- **After 60 days no parts can be returned**