MONITOR LT2

LARVICIDE TRACKER

OPERATOR'S MANUAL

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MONITOR LT2

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Introduction

Monitor LT2 represents the state-of-the-art in Larvicide Tracking.

Congratulations on selecting the Monitor LT2 specialty vehicle data recorder designed and manufactured by ADAPCO. The Monitor LT2 is the latest GPS model carrying the widely successful Monitor brand dating back to 1993 in the specialty application market. This new LT2 model is far advanced over the previous model in terms of processing speed, power, intuitiveness, accuracy, and much greater memory capacity. Coupling the Monitor LT2 with ADAPCO's proprietary GeoTracker GIS PC software, the Monitor LT2 now provides a new tool for specialty application professionals. The Monitor LT2 is also designed to expand over time as new ideas and/or requirements arise.

The Monitor LT2 is a GPS and "Event" recording and reporting device specifically designed for specialty application vehicle businesses that insist on knowing where their application equipment is and what it is doing at all times. The primary event monitoring objective for Monitor LT2 is the application of a product that flows or is spread at a predetermined rate either to a body of water or from a vehicle moving across the water or ground. A second "Event" is fully definable by the end user and can be used to monitor a host of possible events happening on an application vehicle.

Recording on the Monitor LT2 is accomplished on a simple SD (Secure Digital) memory card and collects and stores data pertaining to the application mission such as:

- ✓ Driver ID
- ✓ Chemical ID
- ✓ Area treated
- ✓ Trip and spray miles
- ✓ Chemical consumption
- ✓ Average spray speed
- ✓ Total spray time
- ✓ Vehicle GPS location with flow status (1 second intervals)

This data can easily be uploaded to a PC and ADAPCO GeoTracker GIS software for report generation and can be imported into most common spreadsheet or database PC programs.

The Monitor LT2 data recorder consists of the following:

1. Monitor 4S Terminal (handheld user interface)
2. Main Unit (CPU)
3. A magnetic mount GPS antenna
4. Insecticide pump with integrated controls (either FMI piston pump or the MFC gear pump)
5. Cabling

Specifications

Main Unit

Processor: ARM9 454 MHz

RAM: 128MB DDR2 RAM

Storage: 4GB microSD

Removable SD-Card: 128MB – 34GB SD or SDHC

Interface: 3 Channels RS232, 1 Channel RS485, 1 Channel USB

Physical: 79.4 x 152.4 x 152.4 mm (3.125 x 6.0 x 6.0 in)

Mass: 916 g (33 oz.)

Enclosure: Aluminum extrusion, Epoxy powder coat

Ideal Temperature Conditions: -40 to +85° C

Ideal Humidity Conditions: 5 to 95% non-condensing

Input Voltage Requirements: 9V to 20V dc

Power Draw (Current): 250mA peak, 170mA typical

GPS Receiver

Interface: RS232

Channels: 32 Channel GNSS

Receiver: L1, FDMA, and E1

Update Rate: 1 Hz

RF connector: SMA

Temperature: -40 to +85° C

Humidity: 5 to 95% non-condensing

Power: 3.3VDC

Snap start: < 3 sec. @ 25 minute off period

Hot Start: 1 sec. (typ.)

Warm Start: 15 sec. (typ.)

Cold Start: 35 sec. (typ.)

Satellite Reacquisition: 100 ms

GPS Antenna

Frequency: 1575.42 MHz ± 3 MHz

Axial Ratio: 3 dB typical

Impedance: 50Ω

Peak Gain: 4 dBic Min.

Power handling : 1 watt

Polarization: RHCP

Amp Gain without cable: 27 dB typical

Noise Figure: 1.5 dB typical

Filtering: -30 dB (±100 MHz)

DC voltage: 3.3V ± 0.3V

DC current: 14 mA max.

Cable: RG174, 5 meters

Connector: SMA

Mounting: magnetic base

Temperature:-40 to +105° C

Humidity:0 to 95% non-condensing

I/O

I/O: Black and White Pair when both wires touch. Orange and Blue Pair TBD

Part 1: Installation

The Monitor LT2 is designed with ease of installation in mind. By reading the installation procedures, anyone, regardless of their background or experience level can install the Monitor system on any vehicle type.

Complete each of the following steps before moving on to the next. Completing the steps in order will simplify the installation and promote understanding.

Step 1: Placement

- The Monitor LT2 is not designed or intended to be mounted outside in the elements but rather inside a vehicle or a waterproof enclosure. It is not a sealed unit and water/moisture can easily enter the enclosure and cause damage to the contents inside.

  Note: Do not mount the Monitor LT2 enclosure outside of the vehicle!

- The LT2's aluminum enclosure is small enough to mount either under a seat, on the rear bulkhead of a pickup truck or in the trunk of a car whichever is applicable. When choosing a location to permanently or even temporarily mount this unit, consider the distance from a power source (fuse panel) and cable access to the outside of the vehicle. The Monitor LT2 will almost always require at least 2 cables or wiring harnesses to be routed to the outside of the vehicle. These 2 cables are the "event" wiring harness and the GPS magnetic mount antenna cable.

- The data collected by the Monitor LT2 is stored and located on the SD (Secure Digital) card and consideration should be given when selecting the mounting location so that this memory card can easily be accessed.

- Additionally, the 3 LED's must be clearly visible to ensure there is not power on the LT2 data recorder when removing the SD card.

> **Warning: DO NOT remove the primary SD memory card if the Green LED is illuminated on the Monitor LT2 data recorder. Doing so may corrupt data files on the card.**

- When mounting the Monitor LT2 data recorder to a vertical surface, the preferred method is for the SD card and LED's to be facing upward and the cable connection to face downward. This allows easy access for the memory card as well as visual verification that power is not applied when removing or inserting the SD card to/from the Monitor LT2 recorder.

Step 2: Installing the Monitor LT2 Data Recorder

Supplied with the Monitor LT2 data recorder is a package containing the following:

- #10 x 1.5” black self tapping screws (4 ea.)
- #10 x 1” black self tapping screws (1 ea.)
- Adhesive cable anchors (3 ea.)
- Fuse Tap with lead wire (2 ea.)
- 5A MiniBlad Fuse (2 ea.)
- 4-Pin Automotive Relay (1 ea.)
- Blue #10 ring terminal (1 ea.)

Once you have chosen the appropriate location an orientation to mount the Monitor LT2 data recorder, secure the device in place using a cordless drill with Philips driver bit and 4 of the black self tapping screws provided in the installation package. Sink the screws only as far as needed to hold the module securely in place with approximately equal holding pressure at each corner.

Step 3: Cutting or punching an access hole

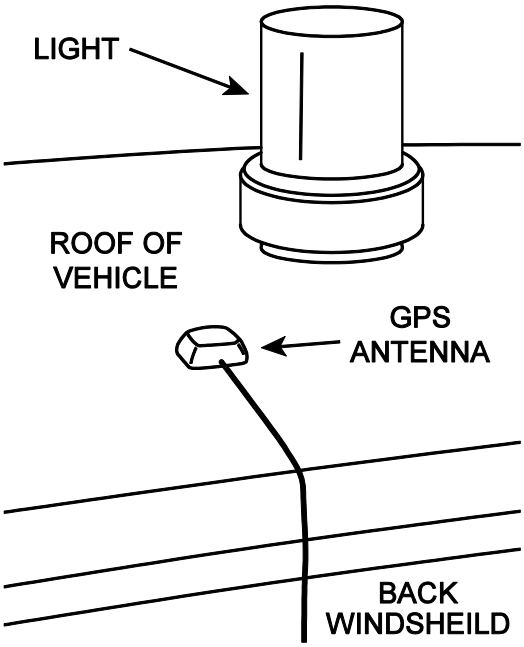
- An access hole is needed in the vehicle to pass both the GPS antenna cable and the pump cable wires through. Select an “out of the way” place such as the lower corners of the cab bulkheads and punch or drill a 1-1/4” hole. Note: Some vehicle types may already have an access hole. In this case, use this access if large enough to pass both the pump and GPS cable ends through.

- Punching or drilling holes in vehicles is not preferred but is sometimes necessary. A single XXXXXX1-1/4” hole is large enough for both cable connectors to pass through with the least amount of effort. It is up to the users’ discretion to use different access holes for each cable, if desired. Regardless, if using one access hole or two, take appropriate precautions to protect cables from rough or sharp edges.

Step 4: Mounting the GPS Antenna

The antenna module is housed in a custom styled, molded encasement that provides a rugged, durable protective cover, ready for exposure to the elements. When mounting the antenna module, it is important to remember that GPS positioning performance will be most optimal when the antenna has full view of the sky ensuring direct line-of-sight to all visible satellites overhead.

Select a position on the vehicle to place the magnetically mounted GPS antenna.



Note: Antenna power and signal receptions are transmitted through the coaxial cable. Damage to this cable can result in loss of Satellite reception, intermittent reception or false readings. The antenna coaxial cable should not be cut or bent sharply. 90° bends in the coaxial cable will most certainly damage the cable.

Straighten the antenna's cable to facilitate ease of cable routing.

Secure the cable to the vehicle's exterior with the adhesive wire tie anchors provided.

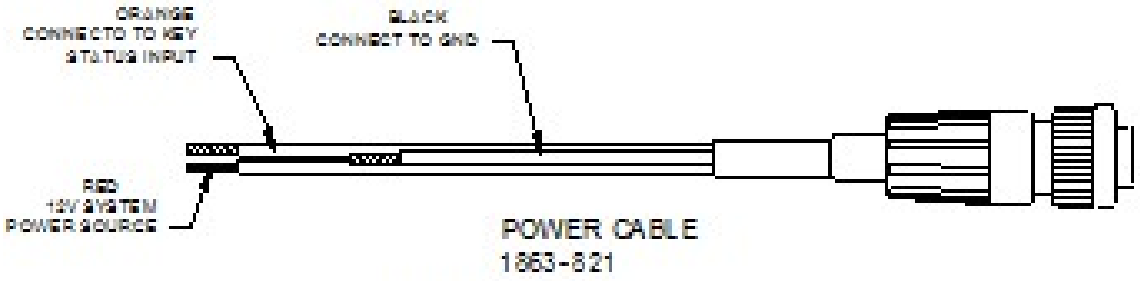
Route the coaxial cable through the access hole or drilled hole (Step 3). Be careful not to bend or kink the cable.

Once cable is routed to the inside of the vehicle, Roll up excess coaxial cable and tuck into a secure area leaving only enough cable to reach the connector on the Monitor LT2 Main Unit.

Connect the antenna cable to the corresponding SMA RF bulkhead connector on the Monitor LT2 Main Unit labeled "GPS ANTENNA". Thread the antenna cable connector on clockwise hand tight. With a 5/16" open end wrench, snug the connector slightly but take care not to over tighten.

Step 5: Connecting Power to the Monitor 4S System

Within the packing container find the circular connector wiring harness (part number 1861-257) with 3 pins and 3 differently colored wires as shown below and uncoil.



CONNECTIVITY		
PIN A	BLACK	CONNECT TO GROUND
PIN B	ORANGE	CONNECT TO IGN. 12V
PIN C	RED	CONSTANT 12V SOURCE

Connect the circular connector to the corresponding connector on the LT2 module labeled “PWR IN” by first inserting the front end of the connector while aligning the keyway which is located at the “12 o’clock” position. With the keyway aligned, insert the connector further and with slightly more force while simultaneously turning the outer ring clockwise until it stops. Then grip the outer ring tightly and continue turning clockwise until reaching a small detent locking position. Caution: do not force the connector together and do not over-tighten the outer ring.

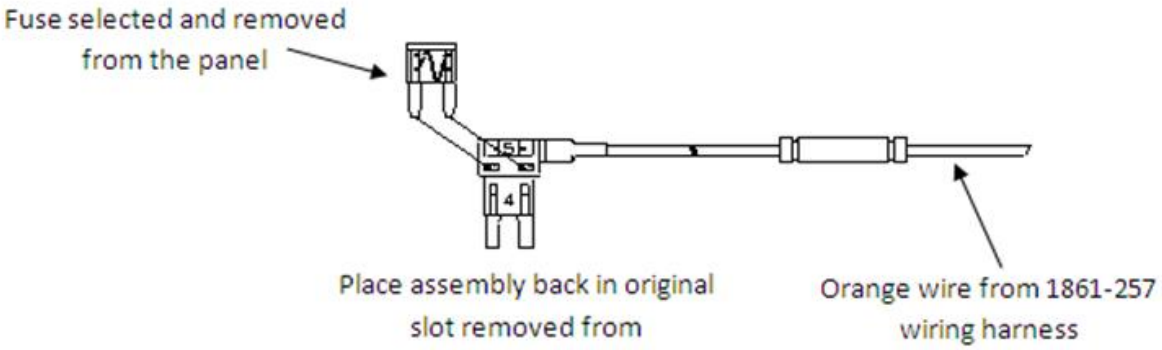
Next, find the black wire within the cable just connected and also find a bare metal place to connect this black wire using the blue ring terminal located within the installation kit as close to the module as possible. With wire cutters and crimpers, determine the length of the black wire required to reach the metal grounding point selected, then cut the wire to length, strip the outer jacket back approximately 3/8” and crimp the blue ring terminal to the end of the black wire. With one of the remaining self-tapping screw in the installation package, secure the black wire and ring terminal to that metal grounding location previously selected.

> **Note: It is highly recommended to ground the black wire and ring terminal of the 1861-257 wiring harness directly to a metal surface. Through vehicle carpet or floor pads can lead to intermittent power deficiencies.**

The remaining two wires, red and orange will need to be routed carefully out of any “kick path” to the vehicles fuse panel where both a continuous and an ignition power source can both be found.

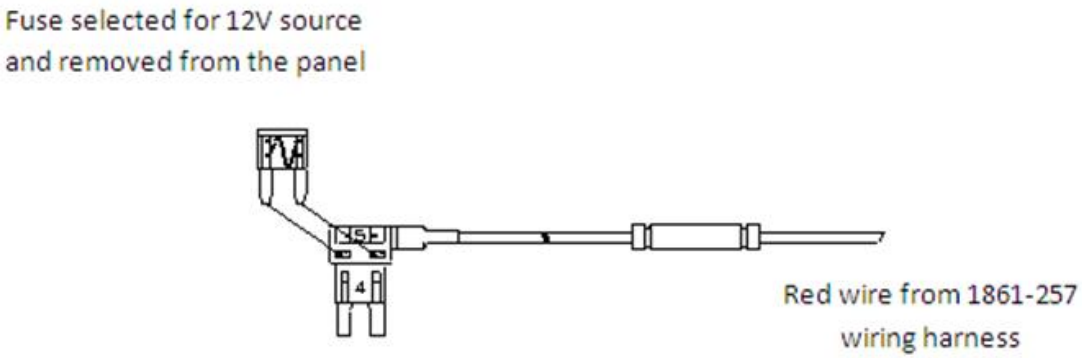
Power (+12V DC) is supplied to the Monitor LT2 data recorder from the vehicle’s electrical system when the key is turned on via an electronic sensed from the orange IGN (+12V DC) wire.

- Refer to the specific vehicle's "Owner Manual" for fuse location and power distribution. Locate the IGN (Ignition) fuse slot. Test this IGN slot with a test light or voltmeter for 12 volts with the key both on and off. Voltage should only appear with the key in the "On" position. If the IGN fuse slot cannot be found on the vehicle, or it is already in service with some other accessory, refer to the owner's manual again and find the fuse associated with the Radio. The radio fuse is usually a 15 or 20 amp fuse and provides a clean power signal. Once the fuse is located, ensure it is active with the key on only by using a test light or voltmeter. Remove the fuse and place into the empty lower slot in the fuse tap shown below alongside the 5 AMP fuse which will support the power for the Monitor LT2 module, then replace the complete assembly back into the original fuse slot.



Locate and connect the orange wire to the butt splice on the end of the fuse tap by using a set of wire crimpers. This connection to the fuse panel in known as the "Key Status Input" and to re-emphasize should only be "hot" when the vehicles' key is on.

- Next find a constant 12V source in the fuse panel while the key is turned off. Use the same process with the second fuse tap provided, again with a 5 AMP fuse provided, and then connect the red wire of cable 1861-257. This will be the 12V system power source.



Note: The Monitor LT2 has its own fuse protection. Using the active side of any fuse will not cause damage to other accessories due to excessive current.

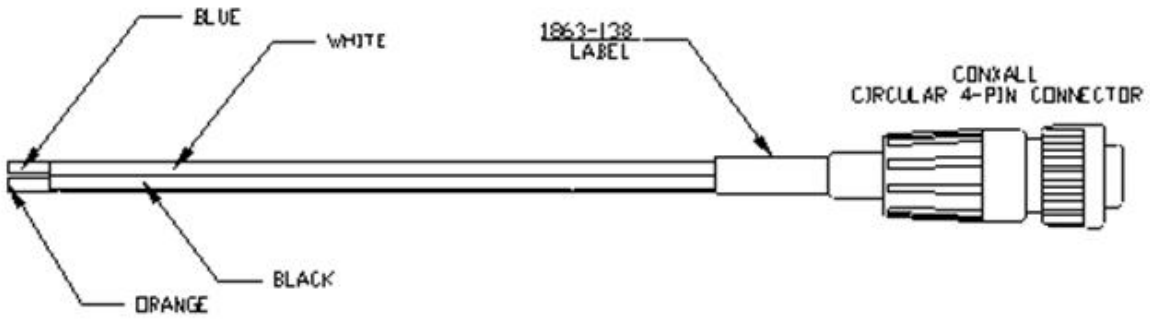
Take care when routing the power wiring harness from the LT2 module to the fuse panel to protect the wires along the full length. A few extra minutes here will save time and possibly a repair bill later if a wire becomes frayed and cause a short requiring service. Typically, this cable will be routed under the floor mats, carpet or lower door molding to the fuse panel.

Step 6: Event Hook-Up (General)

Monitor LT2 supports 2 discrete inputs and are labeled “Event Lo” and “Event Hi”. Event Lo is a dedicated flow event input which can take a couple of configurations, both of which will be further described in this manual. Event Hi however, can be defined by the end user for whatever purposed deemed appropriate and is manifested in each data string as a single event. For example, if the desire is to monitor an amber safety beacon, the event hi configuration would indicate that the beacon is simply on or off, no further information is compiled in relation to it. Event Lo is quite opposite. Since it is tied directly to “flow”, reports can be generated that compile significant information based on known parameters provided by the end user. Application rates can determine how much product was applied where, when and by whom. Flow totals can be generated and further information can also be accessed based on Geo-referencing points and user defined areas.

- Find the cable labeled 1863-138 (multi-colored 4-pin discrete wiring harness)
- Connect the circular connector to the corresponding connector on the LT2 module labeled “EVENT I/O” by first inserting front end of the connector while aligning the keyway which is located at the “12 o’clock” position. With the keyway aligned, insert the connector further and with slightly more force while simultaneously turning the outer ring clockwise until it stops. Then grip the outer ring tightly and continue turning clockwise until reaching a small detent locking position. Caution: do not force the connector together and do not over-tighten the outer ring.
- Route the remainder of the wire harnesses length to the outside of the vehicle, through either the grommet used for the GPS cable or the access panel, then to the location where the flow event (event lo) will occur.

Event Wiring Harness (1863-138)



Function Name	Wire color	Wire size	Conxall Pin
Event Lo	White	18 AWG	1
GND	Black	18 AWG	2
GND	Blue	18 AWG	3
Event Hi	Orange	18 AWG	4

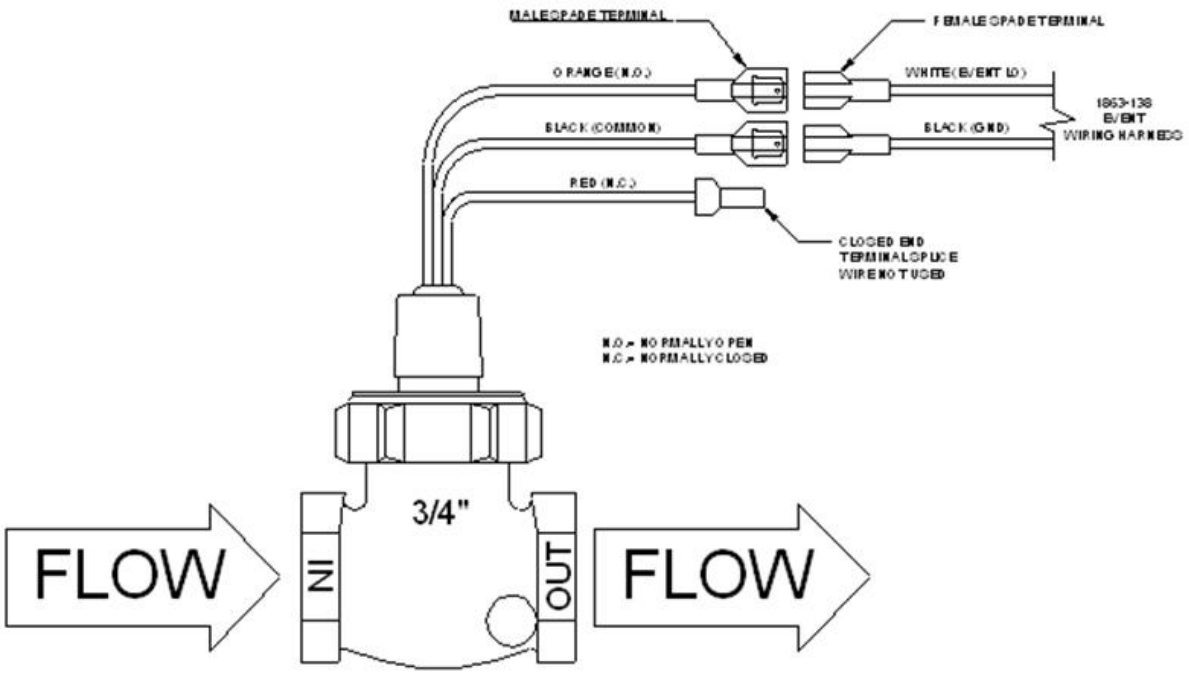
Event Lo

As previously discussed, Event Lo is a dedicated “Flow” event and should be configured to measure a flow event in either “Actual flow” or an “Assumed flow” by a contact closure. Event Lo is a ground (GND) contact closure that is pulled high (3.3V) through a 10K resistor to prevent a floating indication. When a ground contact closure is made, the 3.3V is pulled Lo to a point where the LT2 data recorder sees it, processes it, and records it along with the GPS information every second.

There are two methods of measuring either “Actual flow” or “Assumed flow”. Follow these steps to hook up EVENT LO whichever way works best for your operation, spray system, or vehicle.

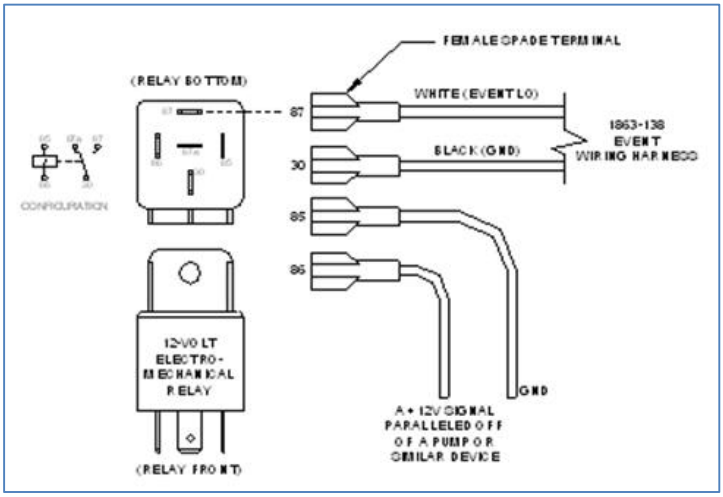
Actual flow utilizes a flow switch which has a single pole, double throw reed switch incorporated within. The flow switch has 3/4” Female NPT threaded ports both on the input and output ends. The switch is activated when a minimum flow of ½ gallon/minute is passed through the flow switch’s bronze housing. If your spray system flow rate does not exceed ½ gal/min, skip this type of hook up and look to the “Assumed Flow” configuration or contact ADAPCO for further assistance.

Connect the event wiring harness 1863-138 as shown in the illustration below using the wire terminal connectors supplied in the installation package. The red wire on the flow switch is not used; take precautions to ensure it cannot short against anything by crimping on a closed end wire splice.



When plumbing the flow switch into your specific sprayer, choose a point within that's only flow path is to the nozzle or end of the spray hose. Do not place the flow switch where it would be part of a bypass or recirculation loop when a sprayer is running but the nozzle is not activated. Having the flow switch within the bypass or recirculation loop will cause the "event" to show up when the spray is off or not flowing out of the nozzles, instead of when it actually is flowing out of the nozzle.

Assumed flow utilizes an electro-mechanical relay which provides a signal input needed to indicate flow to the Monitor LT2 but by some other means electrically. Again, Event Lo is a GND contact closure and a relay can be triggered by a positive voltage. See example at right.



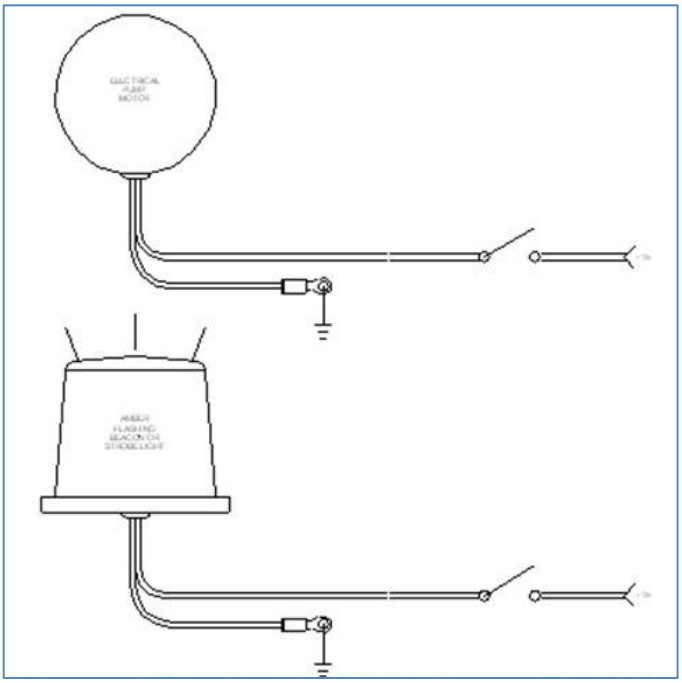
If your spray system is powered not by a small internal combustion engine, but maybe an electrical pump or an injection pump, it may be simpler to use a simple 12-volt relay as shown in the illustration rather than to plumb in a flow switch as in the previous method. This can easily be accomplished by mounting the all-weather relay in a sensible location then parallel a 12-volt wire from it over to the relay pin 86, then connect a wire to pin 85 and to a good ground (GND). This will satisfy the requirement for the 12-volt relay coil and energize the relay each time the pump is then turned on. Next connect the white and black wires from the event wiring harness 1863-138, to pins 87 and 30 respectively. Pin 87a is a normally closed contact and is not used.

Event Hi

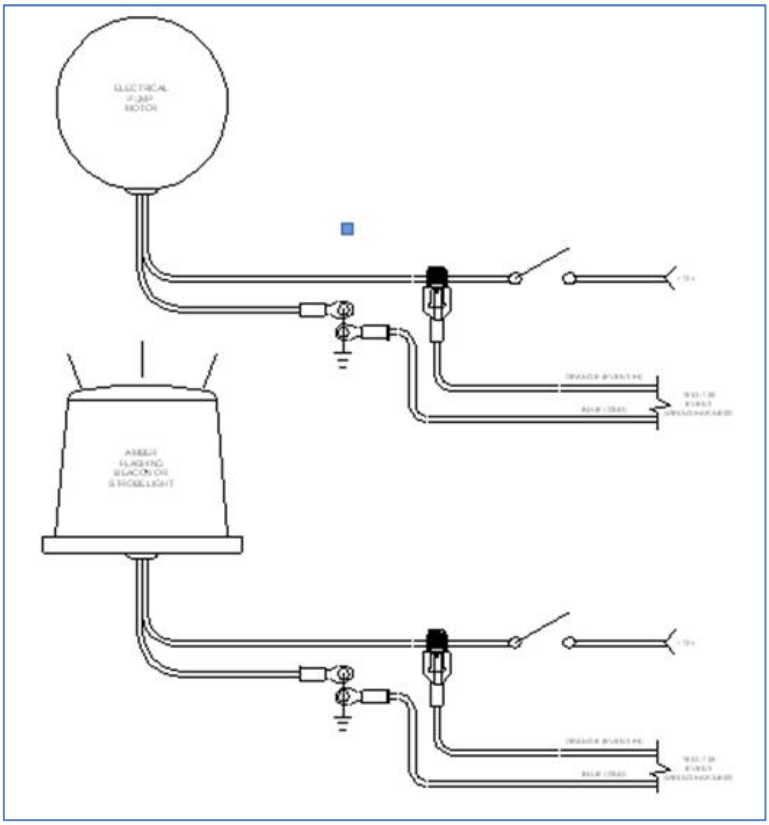
As previously discussed, unlike Event Lo which is a dedicated Flow event, Event Hi is a user defined event which could include many things such as safety lights/beacons on or off, closed or open doors, a hose real vs. a fixed spray nozzle, formulation tank A vs. formulation tank B, etc. Also unlike Event Lo which is a ground (GND) contact closure, Event Hi is a positive voltage input with a range of 3.3V-15 V DC. When an Event Hi positive input or positive contact closure is made, the LT2 data recorder sees it, processes it, and records it along with the Event Lo and GPS information every second.

The following are a few ways to connect the Event Hi input, Contact your ADAPCO service representative if you need further understanding or assistance.

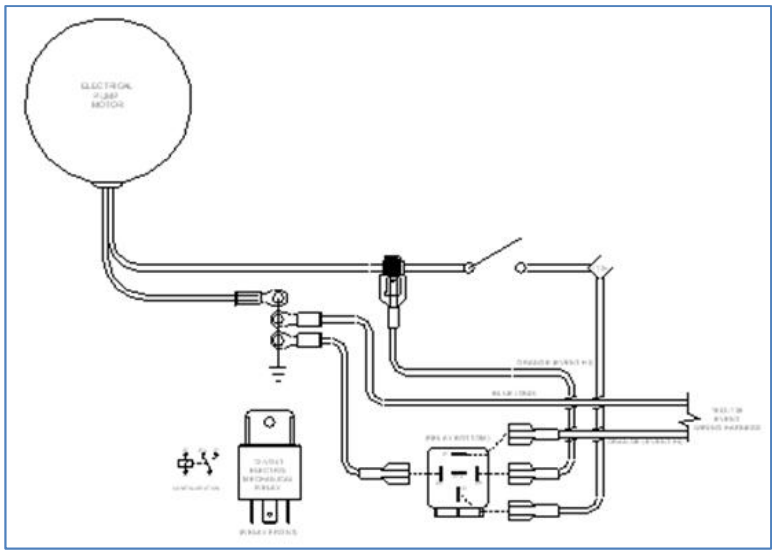
A typical Event Hi type of condition:



Note: When hooking up the Event Hi input, keep in mind that the ground (GND) wire to the device being monitored and the GND of the data recorder must be common.



To keep wire lengths short, a relay can also be used to satisfy the Event Hi positive voltage input such as the following illustration.



Part 2: Operation

Secure Digital (SD) Card

The memory card type used in the Monitor LT2 is a common Secure Digital (SD) card found in most any consumer outlet. The most common size as of this manual's writing has 4GB storage capacity. The Monitor LT2 data recorder is delivered with 2 of these 4GB SD cards. **It is HIGHLY RECOMMENDED that only SD or SDHC type cards be used in Monitor LT2 and NOT SDXD (extra high density secure digital) types.** If physically only one of these cards is to remain on the LT2 data recorder, ensure the SD card used is placed into the PRIMARY card slot for recording purposes.

SD Card Proper Insertion and Removal

The Monitor LT2 data recorder requires no operator interface; the operator of the vehicle has no responsibilities in setting up the unit to perform a task. The setup is all accomplished in the installation of the unit and how the event lines are interfaced. The operator or supervisor need only ensure the SD (Secure Digital) card is inserted in the Primary SD card slot and that there is no power on the Monitor LT2 data recorder when this takes place. The SD-Card goes in with the pins facing upwards.

Warning: DO NOT insert the primary SD memory card if the Green LED is illuminated on the Monitor LT2 data recorder. Doing so may corrupt data files on the card.

To install the primary or secondary (spare) SD card, simply align the card, insert and push in the card until it is full seated. To remove the SD card, first push in and let go. The card connector will then release the card and you can remove it fully from the unit. This type of SD card connector is known as a Push-Push.

Warning: NEVER remove the primary SD memory card if the Green LED is illuminated on the Monitor LT2 data recorder. Doing so may corrupt data files on the card.

Operational Power

The Monitor LT2 data recoding module powers up when the vehicle key is turned on. The module will remain on as long as the vehicles key is not turned off and/or removed.

After a day or weeks' worth of missions, it is important to know that when the vehicle is stopped and turned off, the SD card cannot be removed until the 3 seconds has elapsed and the LT2 data recorder module safely shuts itself down. Before removing the SD card, ensure the GREEN LED is NOT illuminated before proceeding.

LED's and their meaning

There are 2 LED light indicators on the back panel of the Monitor LT2 data recorder; they are color coded in 2 different colors with each having a defined meaning.

Green- the Green LED will remain illuminated when the Monitor LT2 is powered up. This occurs when the vehicle key is turned on.

Red- the Red LED is a GPS indicator that illuminates or flashes. The LED should blink single blinks if GPS is not acquiring, or double-blinks if GPS has acquired. While booting up and shutting down, LEDs will blink on and off solid for small amounts of time.

Part 3: Trouble Shooting

Monitor Trouble Shooting

SYMPTOM	PROBABLE CAUSE	REMEDY
No Green power LED when vehicle switch is on	Blown fuse at fuse panel	Check and Replace if blown
	Loose connection	Check connection at both ends of power harness
	Dead battery on vehicle	Recharge or replace
	Intermittent GND	Check power wiring harness GND wire
	Cable not connected	Reconnect
GPS not acquiring, blinks 1X per second	Bad connection	Secure cable connection to LT2
	Coax cable bent sharply or kinked, damaged	Check entire length, replace if damage found
	Antenna obstructed	Vehicle must be outside with clear view of sky
	Antenna obstructed	Must not be under or next to a metal object
	Battery backup failure- lost almanac	Return to mfg. for battery replacement
Monitor LT2 module will not shut down	Blown fuse on power/key input	Check and replace if blown
	Loose connection at fuse tap	Check connection at fuse tap
	30 minute keep alive time has not elapsed	Wait 30 minutes after key is shut off to determine
	Circuit failure	Return to mfg. for diagnostics and repair
Event Lo is asserted all the time	Flow switch's red wire connected	Connect orange wire vs. red wire of flow switch

SYMPTOM	PROBABLE CAUSE	REMEDY
	Loose connection	Check connection at both ends of event wiring harness
	White wire on harness 1863-138 is shorted to GND	Check white wire entire length
	Check with digital volt meter	White wire should read 3.3V DC
		Black wire should show continuity to GND
		White wire should read <1V DC when flow occurs
	Relay (if used) wired incorrectly	Check wiring, refer to installation portion of manual
	Relay (if used) remains energized continuously	Ensure relay coil is not energized
		With terminals removed, check continuity between contacts without relay energized
	Circuit failure	Return to mfg. for diagnostics and repair
Event Lo will not assert when it should	Flow switch plumbed in backwards	Check flow switch orientation and direction of flow
	Loose connection	Check connection at both ends of event harness
	Flow switch wired incorrectly	Ensure flow switch black and orange wires used
	Relay (if used) wired incorrectly	Check wiring, refer to installation portion of manual
	Relay (if used) not being energized from flow source	Ensure 12V is going to relay when flow occurs
	Monitor LT2 module is not on	Ensure power is applied when operating the event

SYMPTOM	PROBABLE CAUSE	REMEDY
	Circuit failure	Return to mfg. for diagnostics and repair
Event Hi will not assert when it should	GND wire not common	Ensure blue wire from event harness is connected to the same GND as the device used as a trigger
	Loose connection	Check connection both ends of event wiring harness
	Voltage input to small or large	Ensure input voltage between 3.3-15V DC
	Relay (if used) wired incorrectly	Check wiring, refer to installation portion of manual
	Event Hi positive and negative wires backwards	Ensure Orange wire is +voltage, Blue is GND
	Circuit failure	Return to mfg. for diagnostics and repair
Event Hi is asserted all the time	Continuous voltage 3.3-15V is being applied	voltage should only be present when event happen
	Relay (if used) wired incorrectly	Check wiring, refer to installation portion of manual
	Circuit failure	Return to mfg. for diagnostics and repair
Red LED is on continuously	SD card is full of data	Upload contents of SD card into GeoTracker and then erase the contents
	System failure	Return to mfg. for diagnostics and repair

Part 4: Warranty

Standard One (1) Year Warranty Policy

ADAPCO, Inc. warrants all products, which it manufactures, to be free from defects in material and workmanship for a period of one (1) year from the date of original delivery. Warranted products or "manufactured equipment" must be purchased from ADAPCO, Inc. or its authorized distributor.

Manufactured Equipment

- Monitor
- Wingman
- FFAST
- ADAPCO GPS receiver
- ADAPCO light bar
- ADAPCO data terminal
- ADAPCO touch screen
- ADAPCO power supply

Customer: _____

PO#: _____

Product: _____

Serial #: _____

Delivery Date: _____

Warranty Period: _____ *through* _____

ADAPCO, Inc. reserves sole discretion regarding repair or replacement of ADAPCO, Inc. equipment during the warranty period deemed defective due to manufacturer fault. Warranty coverage for components of ADAPCO, Inc. equipment manufactured by others, will be covered in accordance with the terms and duration of such manufacturers' warranties.

LIMITATION OF COVERAGE: This warranty does not cover damage, deterioration, normal wear and tear or malfunction resulting from: defects of product components not manufactured by ADAPCO, Inc., failure to follow instructions supplied with the product, accident, misuse, abuse, theft, fire, flood, moisture intrusion, sand, liquids, impact, wind, lightening, power fluctuation, cable damage and adverse atmospheric conditions or acts of nature; all of which are considered beyond the control of the manufacturer.

Products which have been disassembled repaired, tampered with, altered or modified by persons other than manufacturer authorized service personnel will no longer be covered by this limited warranty. Manufactured equipment using GPS receivers, cellular or RF modems require sufficient levels of service or signal strength to maintain certain functions. Interruption of these functions due to geographical location or third party technical difficulties does not constitute a defect or lack of workmanship of manufactured equipment.

EXCLUSION OF DAMAGES: Manufacturer's liability is limited to the repair or replacement of the component or product. Manufacturer shall not be liable for damage to other property caused by any defect in the product, damaged based on inconvenience, loss of use, lose of time, loss of profits, loss of opportunity, interference with business relationships or other commercial loss. Exclusion or limitation of incidental or consequential damages may not apply in your state.

LIMITATIONS OF IMPLIED WARRANTIES

There are no warranties, expressed or implied, which extend beyond the description contained herein including the implied warranties of merchantability and fitness for a particular purpose.

WARRANTY SERVICE & SUPPORT: Units returned to Manufacturer within the terms and conditions of this warranty will be repaired or replaced at no charge to the customer. Shipping charges incurred to return any item covered under this warranty will be credited at customers request when original shipping receipt is provided. Amounts credited will be limited to UPS Standard Ground Rates.

IF A DEFECT EXISTS: Manufacturer at its option will:

1. Repair the product at no charge, using new or refurbished replacement parts.
2. Exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is functionally equivalent to the original product.
3. Refund the purchase price of the product.

WARRANTY SERVICE PROCEDURE:

1. Call ADAPCO, Inc Technical Support at 800-367-0659 (8:00am–5:00pm EST) Monday through Friday. Please provide the serial # for the product requiring service. Questions or comments can also be sent anytime to support@myadapco.com.

2. ADAPCO, Inc. Technical Support staff will assist you in troubleshooting your system to determine the best option for repair. In most cases, the fastest and most efficient mode of repair will be accomplished through one of the following methods:

   a. **Telephone Support (within 24 hrs.)** – Certain hardware and software issues can be identified and resolved over the phone. It is helpful to have the person most familiar with the system available. (i.e. IT service or operations personnel)
   b. **Desktop Streaming On-Line Web Support (within 24 hrs.)** – Additional support is available through exclusive ADAPCO real-time desktop streaming software.
   c. **Express Component Replacement –** Your technical service representative may determine a specific component is related to the problem. In support of this warranty a replacement can be shipped to you at no charge providing the defective component is returned to ADAPCO, Inc. within 30 days of receipt of the replacement component. Customer may be invoiced for replacement component if defective component is not returned to ADAPCO, Inc. within 30 days.
   d. **Express System Repair (48 Hr. turn-around) –** In support of this warranty, ADAPCO, Inc. will provide guaranteed 48 hour turn-around service, from time of receipt, at an ADAPCO, Inc. authorized service center. Products repaired at our service center will receive a full systems analysis, repair and post-repair testing before being returned to you via **UPS 2nd day express** shipping.
   e. **On-site repairs (Approximately 3 weeks) –** Due to extended service times and reduced field capabilities this option is often the least efficient. Should your technical service representative determine on-site service is necessary we will make every attempt to provide on-site support as quickly as possible.

Extended Warranty service Policy (Optional)

Extended Warranty Options – **Within ninety (90) days of delivery** of ADAPCO, Inc. warranted equipment

Serial #: _____ a one or two year extension of the warranty period may be purchased for a maximum extension of two years beyond the standard warranty period. Warranty extensions can be purchased by contacting your sales representative or contacting ADAPCO, Inc. Customer Service by calling (800) 367-0659 within 90 days of delivery.

Price of 1 (one) year extension **$_____**

Price of 2 (two) year extension **$_____**

Customer Acceptance: This warranty/extended warranty confirms delivery of above equipment in satisfactory condition and working order. Please sign below to authorize the terms and conditions of this warranty agreement and return the completed warranty to ADAPCO, Inc. Please use our toll free fax: (866) 330-9888, or mailing address below.

Customer:		**ADAPCO, Inc.:**	
Authorized Signature:	_____	Authorized Signature:	_____
Date:	_____	Date:	_____
Printed Name:	_____	Printed Name:	_____
Title:	_____	Title:	_____

Return via FAX to (866) 330-9888 *

Post Warranty Expiration repairs

These terms apply after warranty expiration or if the customer chooses not to purchase a warranty: units returned to ADAPCO, at customer expense, will be repaired at the rate of $95.00 per hour for labor, plus required parts. In addition, travel time and travel related expenses, which will vary according to location, would be added to the repair invoice for work done on site. (*Repairs on non-warranty equipment performed on site at the same time as other equipment with warranties will not be charged for travel*.) Software upgrades will be made at the rate of $100.00 per unit. **Some repair/replacement parts for expired equipment may not be available.**

Upon acceptance of this Extended Warranty, please confirm and/or revise serial numbers provided on the attached spreadsheet. Please sign below and include purchase order, if required. Return to:

ADAPCO, Inc.

550 Aero Lane

Sanford, FL 32771

Toll Free Fax: 866.330.9888

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