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ADS SpiderTM User Manual

Compact, Low-Power Telemetry, Logging, and
Alarm System



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Warnings and FCC Compliance

Personnel installing and maintaining this equipment should follow all guidelines presented in this manual concerning installation and maintenance. Failure to strictly adhere to these guidelines can result in personal injury and/or damage to the equipment.

Hazardous Area Notice

The ADS Spider and accessories are not designed for use in hazardous areas. Any use of a Spider in a known, rated (per NEC Article 500) Explosion Potential area is solely at the risk of the user.

Communications Disclaimer

The ADS Spider uses publicly available land-line telephone or third-party GSM/GPRS wireless communication services and, therefore, cannot control the availability of these services. For applications where the Spider provides alarms using land-line or wireless communication, problems at the carrier level can delay or totally prevent the delivery of alarm messages. If the user has questions regarding the availability of services in an area or information about outages/interruptions that may have affected service, the user should contact the telephone company or wireless provider directly.

FCC Compliance

To comply with the Federal Communications Commission (FCC), and European regulatory agencies, ADS Environmental Services provides the following information concerning Spider installation and operation.

FCC Part 15

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 in a residential installation. This equipment

generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by turning the equipment off and on), you should try to correct the interference by one or more of the following measures:

- Reorient or relocate the radio or television antenna.
- Move and/or increase the distance between the device and the radio or television.
- Plug the device in an outlet different than the radio or television.

If these suggestions do not help, contact the ADS Client Services Department at supportcenter@adsenv.com or 877-237-9585 or an experienced radio/television technician.

GSM/GPRS Modem Information

The wireless ADS Spider contains a third party GSM/GPRS modem manufactured by Wavecom. This modem is a Fastrack Supreme 20, model number WM20452, FCC ID O9QE2687. Use of products containing this modem must be aware of the following:

Contains FCC ID: O9QE2687

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE: The ADS power supply/charger (P/N 3800-0165) must be used when powering the ADS Spider externally to maintain the FCC certification. Use of any other power supply must be pre-approved by ADS prior to installation or the ADS Spider product warranty and FCC certification may become void.

Product Warranty

This section includes the warranty information for the ADS Spider.

New Product Warranty

All new products supplied by ADS will be free from defects in material and workmanship for up to one (1) year following the date of shipment from ADS. During this warranty period, upon satisfactory proof of a defect, the product may be returned for repair or replacement, at ADS' sole option. No returns will be accepted unless the Owner has prepaid shipping and has received a prior authorization return number from ADS. Please contact ADS to obtain an authorization return number. Warranty repairs and replacements will be performed only by ADS. Any unauthorized repair or replacement will void this product warranty. Any repair or replacement will be covered by this new product warranty for ninety (90) days from the date that such repaired or replaced product is shipped from ADS. This warranty is available only if the product has been installed and operated in accordance with the procedures outlined in the ADS Spider Users Manual. This warranty does not apply to damage by catastrophes of nature, fire, explosion, acts of God (including, but not limited to, lightning damage and power surges), accidents, improper use or service, damage during transportation, or other similar causes beyond ADS' control.

Out-of-Warranty Product Repairs

After the new product warranty expires, a product may be returned, at the owner's prepaid expense, to ADS for repair. The owner will pay for all parts and labor associated with the repair. Any repair part will be covered by the new product warranty for 90 days from the date of shipment from ADS.

Troubleshooting Fee

ADS will charge a troubleshooting fee if the reported product defect cannot be found and/or the reported defect is not due to a defect in materials or workmanship.

Shipping

All repaired products will be returned via surface transportation prepaid by ADS. Import duties, fees, taxes, and other related charges are the responsibility of the owner.

THIS IS THE ONLY WARRANTY FOR ADS PRODUCTS. NO OTHER WARRANTY IS EXPRESSED OR IMPLIED, INCLUDING FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. PRODUCT REPAIR OR REPLACEMENT IS THE ONLY REMEDY. IN NO EVENT WILL ADS BE RESPONSIBLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, OR SPECIAL DAMAGES.

Introduction

The ADS Spider (ADS part number SPIDER-LC-XX) is an integrated monitoring, control, and alarm system designed for remote, low-power applications. It can monitor various inputs, control outputs, generate alarms, and log data. The Spider is a complete system, including all necessary software and hardware.

A Spider can be accessed either locally via a direct Ethernet cable connection or remotely via a modem or by sending and receiving text messages. Setting up and interrogating a Spider simply involves viewing pages through any standard web browser.

NOTE: Text messaging may be referenced as SMS (Short Message Service) in this manual. Therefore, for the purposes of this manual, these terms are interchangeable. While users in the United States typically refer to this method of communication or technology as text messaging, the international community more commonly refers to this as SMS. References to SMS in this manual generally exist only in the context of the Spider user interface.

The Spider is suitable for use by system integrators and OEM applications. It is housed within a compact, plastic enclosure that mounts to a wall for indoor applications. For outdoor installations, the unit must be mounted inside a suitable weatherproof enclosure (provided by the user). ADS also offers a single-box, IP68 (NEMA 6) weatherproof version of the Spider housed in a stainless steel enclosure (ADS P/N SPIDER-LP-XX).

Typical Applications

- Security
- Access
- Air conditioning
- Process Control
- Waste Management



- Irrigation
- Rural Applications
- Environmental Monitoring

System Overview

Each ADS Spider incorporates an industrial controller, an input/output interface, a logger, a GSM/GPRS cellular phone modem, and a battery management system with integrated solar panel / AC charger support.

The ADS Spider is capable of:

1. Monitoring up to eight (8) user inputs
2. Monitoring up to three (3) system inputs
3. Controlling up to eight (8) relay controls
4. Generating up to eight (8) alarms
5. Sending alarm or status text messages
6. Receiving text message commands
7. Sending e-mails (optional)
8. Synthesized voice alarm dialing and call answering (optional)
9. Logging input, control and alarm activity
10. Sending automatic daily reports via e-mail and FTP (optional)
11. Being configured locally by the user through a standard web browser
12. Being configured remotely through Web access (*only available through static IP services offered by AT&T*)

Components

The following components comprise the ADS Spider:

- Base unit (*includes connectors and 120-amp resistors*)
- Power supply/charger (P/N 3800-0165)
- 12-volt, 7.2-ampere-hour backup battery (P/N 507568)
- Battery cable (P/N 3800-0179)
- Ethernet cross-over cable (*included with base unit*)
- Antenna (P/N 507385)

Inputs

The ADS Spider accepts two different types of inputs – native and intelligent.

Native inputs allow simple switch, voltage, and current sensors to be connected directly into the Spider.

Intelligent inputs are available as an option and are used to interface to intelligent sensors. Currently, the Spider supports SDI-12 intelligent sensors. Other intelligent sensor types will be supported in later versions.

Native Inputs

Native inputs are connected to the Spider via two multi-pole connectors. Each multi-pole connector accepts four inputs. They are labeled INPUT1 through INPUT8, and each is provided with two screw terminals. Wire sizes up to AWG 16 may be used. Each input can be configured by the user for operating in one of the following five modes:

1. “SWITCH” – switch closure or voltage-free contact.
Switch inputs detect either an active (ON) state or an inactive (OFF) state. The active state is indicated by shorting the two terminals together, while the inactive state is indicated by the terminals that remain open. A switch state must be stable for a minimum of 5 seconds to be recognized.

NOTE: There is no galvanic isolation between different inputs or the Spider internal circuitry.

2. “ANALOG”
Analog inputs are used to monitor industrial sensors, such as voltage, current, temperature, and pressure sensors. Most common sensor types are supported, including:

0 – 20 mA sensors
4 - 20 mA sensors

- 0 - 2.5V sensors
- 0 – 5V sensors
- 0 – 10V sensors

NOTE: All analog signals share a common ground.

3. “COUNTER”
Counter inputs ensure the count increments each time the terminals are shorted. Frequencies up to 10Hz are supported. The counter will roll-over from 99,999 to 0.
4. “EVENT”
Event inputs are used to record occurrences of pulses. A pulse is generated by temporarily shorting the input terminals together. Minimum acceptable pulse width is 100 ms. Event inputs are suitable for monitoring pulses that occur less frequently than once every 30 seconds. Each time an event occurs, the Spider logs the time of its occurrence as well as the total number of events. The total will roll-over from 99,999 to 0.

NOTE: Battery life will be dramatically reduced if a higher frequency signal is connected to an event input.
5. “DAILY TOTAL”
Daily total inputs are identical to the “EVENT” inputs described above, except that the event total counter is reset to 0 every midnight.
6. “UTILITY METER”
This type of input records the number of pulses in a logging period. It is typically used to record readings from water, electricity, and gas meters.
7. “DISABLED”
This mode disables the input. The input is removed from all reports and menus.

The user can tailor the system by assigning application specific input names. For example, Input 1 may be called “PUMP 3 OK”.

All native input types may be logged and/or used to trigger alarms.

Please refer to *Appendix A: ADS Spider Inputs* on page 83 for a summary of native input types, their specifications, and typical uses.

Intelligent Inputs (*if installed*)

Intelligent sensors are connected to Spider auxiliary connectors. Please refer to *Physical Connections* beginning on page 19 for details.

Currently, the Spider supports SDI-12 intelligent inputs, described in *Appendix I: SDI-12 Operation (if SDI-12 interface is installed)* on page 108.

System Monitors

Each Spider is fitted with 3 System Monitors:

1. System Temperature – measures temperature inside the Spider enclosure
2. Battery Voltage – measures the voltage of an external battery connected to the battery connector
3. Battery Charger Status – gives the current state of the battery charger (*ON* or *OFF*)

System monitors can be used in the same way as inputs (i.e., they may be logged and/or used to trigger alarms).

Controls

The ADS Spider provides eight controls on two multi-pole connectors. Each multi-pole connector accepts four controls. Controls are labeled CN1 through CN8, and each is provided with two screw terminals internally connected to a relay. In the inactive state, the two terminals are open-circuit. Upon activation, the relay switches and the terminals are shorted together. Controls can be activated manually through an active alarm and/or a programmable, built-in timer. Each control has

a dedicated 7-day, 24-hour timer with an unlimited number of user-programmable schedules.

The user can tailor the system by assigning application-specific names to the controls. For example, Control 3 may become “VALVE 4 ON”.

Controls can be managed in four ways:

1. By accessing the “Controls” page with a browser and clicking the ON/OFF buttons
2. By sending control text messages to the unit
3. By programming and enabling the timer
4. By programming alarms to activate or deactivate controls

It is possible to use all four forms of control simultaneously. If a timer is enabled and a manual control command is received through either the browser or a text message, the manual control will take priority, temporarily overriding the timer. The override is automatically cancelled when the programmed timer state matches the manually requested state.

Controls driven by an alarm have the highest priority, overriding both manual control and the timer. Furthermore, if two or more alarms attempt to drive a control in opposite states, the “OFF” command will override the “ON” command.

Alarms

The ADS Spider can generate up to 8 alarms.

Upon activation, an alarm can perform any or all of the following:

- Send text messages
- Send e-mails (if e-mail option installed)
- Dial any telephone and communicate the alarm message in a synthesized voice
- Activate and deactivate controls

Each alarm can be programmed with a name, a trigger source, 3 separate text message telephone numbers, 2 e-mail addresses, 3 separate voice numbers, the text of a message, and the control to be

activated. When the trigger becomes active, the alarm is triggered and the alarm sequence starts.

Alarms are completely independent from inputs. For example, an input can trigger more than one alarm, each of which will send its own special text message to its own special telephone numbers.

Text Messaging

If text messaging is enabled, a text message with the programmed text will be sent to each telephone number, starting with the first. If sending is successful, the unit will wait for 30 minutes (see following note) for the user to acknowledge the alarm sequence.

Acknowledging the sequence stops the sending of text messages.

NOTE: The 30-minute waiting period referenced above for the unit represents the default time period. The user can designate a period anywhere between 0 and 60 minutes.

If sending is not successful (e.g., due to network congestion), the text message will be sent to the same number after 1 minute. Up to three attempts will be made to each number before proceeding to the next number.

After the 3rd attempt to the 3rd number (if applicable), the unit will stop sending text messages and wait indefinitely for the alarm to be reset. This limits the number of text message transmissions per alarm to 9.

E-mailing (*if e-mail option is installed*)

If e-mail sending is enabled, an e-mail with the programmed text is sent simultaneously to up to two addresses. If sending is successful, no more e-mails are sent. If sending is not successful, up to 2 more attempts are made at 3-minute intervals.

Voice Alarming (*if voice option is installed*)

If voice sending is enabled, the Spider will dial the first voice number. If the call is answered, the Spider will identify itself and verbally communicate the alarm message. The recipient can acknowledge the alarm. Acknowledging the alarm will stop all further text message, e-mail, and voice transmissions.

If the alarm call is neither acknowledged nor answered or the line is busy, the Spider will call the second voice number after 2 minutes. If this call is also not acknowledged, not answered or is busy, the Spider will call the third voice number after 2 minutes.

The whole sequence will be repeated up to 3 times. Please refer to *Voice Option* on page 70 for more details on the Spider Voice Option operation.

Control Activation and Deactivation

Alarms can also be used for intelligent control of various systems. For example, a tank level can be maintained by monitoring a water level and by controlling a pump. One alarm is set to trigger when the water level falls below a low level. This alarm is programmed to activate a control output, which, in turn, switches on the pump. A second alarm is set to activate when the water level is above a high level. This second alarm is programmed to deactivate the same control, which switches off the pump. Thus, the tank level is automatically kept between the two levels.

Alarm Acknowledgement

Active alarms can be acknowledged in four different ways:

1. By accessing the "Alarms" page with a browser and clicking on the active alarm
2. By sending a text message to the Spider
3. (*GSM systems only*) By acknowledging the alarm with the phone keypad during a voice call
4. By using the "Auto Acknowledge" feature

Refer to *Acknowledging Alarms* on page 60 for more information.

If an alarm is acknowledged, but its trigger source is still in the active state, a new alarm sequence will NOT commence. Instead, the Spider first will wait for the trigger source to go inactive.

Logger

The Spider incorporates a high capacity solid-state data logger. The logger stores data into non-volatile memory, maintaining its contents in the event of a total power supply failure. All records are date/time-stamped to a resolution of one second.

The Spider logs the following:

1. Input changes
2. System monitor changes
3. Control changes
4. Alarm activations and resets
5. Text message transmissions and their outcomes
6. Text message command reception
7. E-mail transmissions and their outcomes (*when the e-mail option is installed*)
8. Voice alarm transmissions and their outcomes (*when the voice option is installed*)
9. System messages

Switch inputs automatically log an input change. If a switch input is initially in the “OFF” state, goes “ON” for some time, and then goes back “OFF”, both state changes are logged.

Event and Daily Total inputs automatically log a single record per pulse. If an event input is initially in the “OFF” state, then goes “ON” for some time, and then goes back “OFF”, only a single record is logged.

Analog input, counter input, and system monitor logging are enabled by the user.

These inputs are logged using the “SIGNIFICANT CHANGE” logging method. The user specifies the minimum logging period and the

minimum change that requires logging. For example, the logging period may be set to 1 hour and the minimum change to 100. The input will be checked every hour and logged if it has changed by at least 100 from the last logged value. (To log the data every hour, simply set the minimum change to 0.)

While the logging period is shared by all analog inputs, counter inputs, and system monitors, each input has its own programmable minimum change setting.

If logging of an analog input, a counter input, or a system monitor is enabled, it will be logged automatically every midnight. This ensures that at least one sample is recorded every day, even with slowly varying inputs.

Utility meter inputs are logged every logging period, regardless of the amount by which they change. Please refer to *Appendix A: ADS Spider Inputs* on page 83 for a summary of input types.

Automatic Reports (*if installed*)

The ADS Spider can be set up to send periodic reports via e-mail and/or FTP.

E-mail reports are sent to up to three recipients. FTP reports are sent to a user-specified FTP server.

Each report is a spreadsheet file containing data logged over the required period.

The advantage of automatic reports is in the Spider's ability to automatically deliver logged data without user intervention.

An automatic report containing all data logged in the current day can be requested at any time by sending the 'GET REP' text message command to the Spider.

Web Server

A sophisticated web server is built into every Spider. The web server allows users to communicate with a Spider using common web browser functionality locally via Ethernet crossover cable or remotely via Web access (*available only when using AT&T static IP services*). The user can use any computer, regardless of type and operating system, with a web browser (*such as Internet Explorer*) to connect to a Spider. NO SPECIAL SOFTWARE is required.

The web server is used for:

1. Responding to connection requests (via LAN or Web access)
2. Providing password-level security
3. Setting up a Spider for the first time
4. Viewing inputs and system monitors
5. Controlling outputs
6. Viewing and resetting alarms
7. Downloading logged data
8. Performing software upgrades

All operations are performed by accessing simple web pages.

Physical Connections

Antenna

WARNING!! The customer is responsible for providing surge protection hardware and associated grounding systems to meet applicable electrical codes. Where antennas are mounted on rooftops or other elevated locations, ADS strongly recommends providing surge protection. The ADS warranty does NOT cover damage to a unit that has not been protected by properly installed protection devices.

The GSM/GPRS modem in the Spider is a quad-band (850/900/1800/1900 MHz) modem manufactured by Wavecom S.A. GSM carriers in the United States use only the 850 and 1900 frequencies. All ADS-supplied antennas are suitable for use with the

Spider. If a non-ADS antenna is installed, it must be suitable for use with, at a minimum, the dual band (850/1900 MHz) U.S. frequencies. It also must have a VSWR (Voltage Standing Wave Ratio) of less than or equal to 2:1 and be fitted with a female FME-type connector. Gain cannot exceed 3db.

Two types of quad-band antennas are available from ADS for use with the Spider: a magnetic mount whip and a low profile “wing”. Extension cables are also offered in 10-, 25-, and 50- foot lengths. Always use the minimum cable length to prevent signal loss.

The following image displays the two kinds of direct burial antennas (P/N 507385) that support the Spider: the wing (top) and the slim (bottom). The slim antenna is interchangeable with the wing (top) antenna. The only difference between them exists in the location at which the cable exits the element. Both antennas can be embedded directly into road surfaces (and sealed with asphalt) or buried in soil or most other landscaping materials. They also can be mounted covertly onto trees, posts, or other structures that provide the most security and maximum height to ensure the best reception.



The following table lists the part numbers for the antennas, adapters, and extension cables:

Part	Part Number	Comments
Magnetic Mount Antenna	3800-0128	8-foot cable included, requires P/N 507482 adapter to fit FME connector
Wing Antenna	507385	8-foot cable included, no adapter required
SMA/F to FME/F Adapter	507482	
10' FME/M to FME/F Extension Cable	3800-0166-0	
25' FME/M to FME/F Extension Cable	3800-0166-25	
50' FME/M to FME/F Extension Cable	3800-0166-50	

When attaching the antenna or extension cables, **hand-tighten only**. Using tools to tighten antenna connectors may damage them, voiding the warranty. If connections are outdoors, always seal the connection completely using rubber or silicone stretch tape or sealing mastic. *Do not crimp or clamp coaxial cables*, as any change in circular cable geometry will result in signal loss and reduced performance.

INSTALLATION WARNING!! When routing antenna cables inside areas with control equipment, do not lay the Spider antenna cable close to or parallel with any other cabling! Keep the antenna cable at least 6 inches away from other conductors, and cross at right angles only when required. Conduit is not required unless physical protection is necessary.

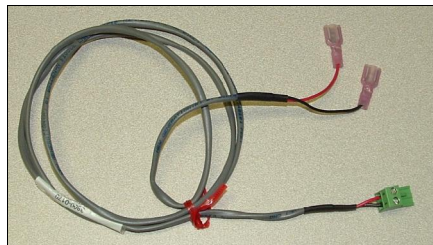
Power

The Spider can receive power either from an AC charger with a backup battery or from a solar panel and backup battery.

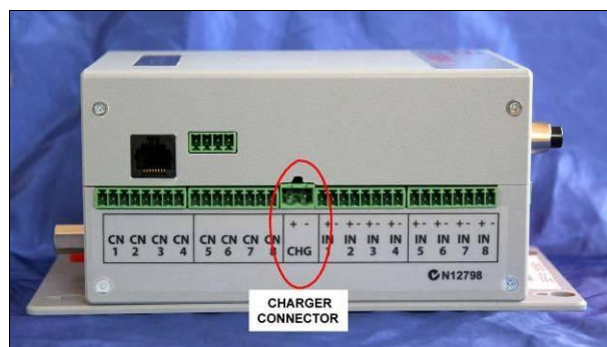
AC Power

AC power comes from an ADS AC power supply/charger (P/N 3800-0165) that provides a plug for direct connection to the unit. A 12-volt, 7.2-ampere-hour gel cell battery (P/N 507568 and connection cable P/N 3800-0179) is available for providing backup power in case of a power outage. Using both sources simultaneously ensures sustained, uninterrupted power to the Spider under any conditions.

The following images represent the AC charger/power supply (top – P/N 3800-0165) and the 12-volt battery with cable (bottom – P/Ns 507568/3800-0179):



The following images show the locations on the unit for connecting the charger and the battery:



NOTE: To use a different DC power/charging source (except for solar), obtain pre-approval from ADS for the alternate power supply prior to connection. Using any other power supply/charger without prior approval will void the ADS warranty.

NOTE: The ADS Spider does not have an ON / OFF switch. Therefore, the unit starts operating when power is applied.

Charging the Battery

Every Spider incorporates an internal battery management system supporting 12-volt sealed lead acid batteries with capacities up to 10 ampere hours. It provides all facilities required for a sophisticated power system, while requiring a minimum number of external components. Simply connect a battery to the battery connector and a solar panel or an AC charger to the charger connector. No external regulator is necessary.

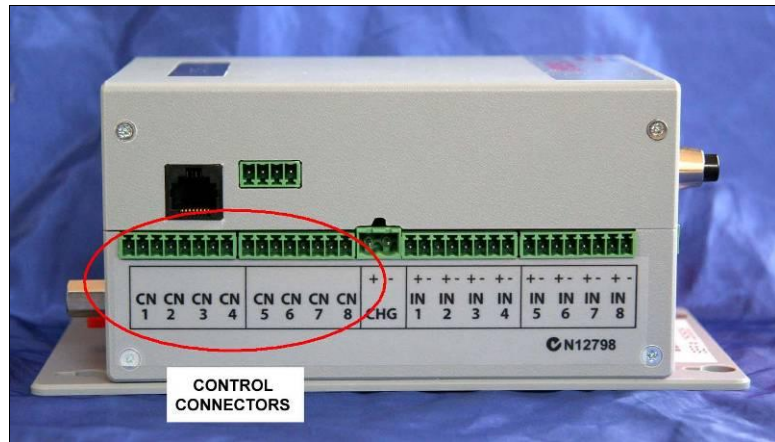
Solar Power

A solar panel, sized by user for the available sun-days, can connect directly to the CHG port on the Spider. The BATT connector can accept a rechargeable battery up to 10 ampere hours in size. If the application requires larger batteries and/or a longer backup capacity, the user is responsible for sizing and coordinating the appropriate panel, charging regulator, and battery storage. ADS neither sells nor supplies these components.

Please observe the correct polarity, as shown on the label next to the terminal blocks, when connecting batteries and chargers to the Spider.

Controls

Controls are connected to terminals marked CN1 to CN8.



Each control provides normally open relay contacts rated to 30 volts, 1 amp resistive loads. **External protection diodes must be installed** when driving inductive loads, such as power relays.

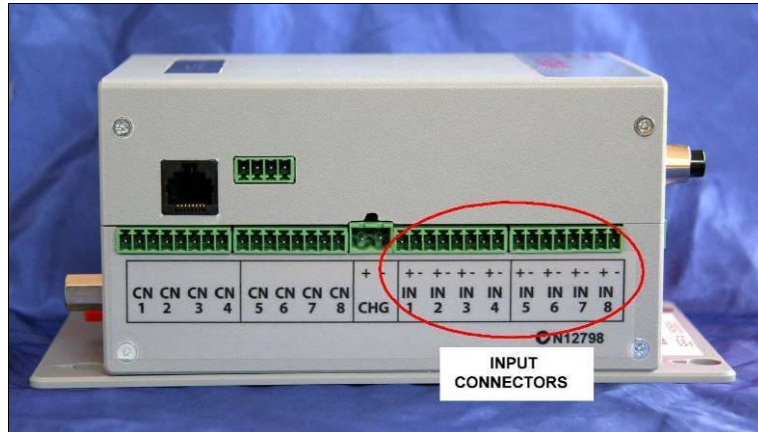
A good general-purpose protection diode, also referred to as a *flyback* or *suppression-type* diode, is the 1N4001. This diode is commonly available from electronics suppliers and consumer sources, such as RadioShack®.

Connect the diode in parallel with the coil on the power relay. Connect the cathode (identified by the white stripe on the diode body) to the positive coil connection and the anode to the negative connection. This will cause the diode to reverse bias when voltage is applied to the coil.

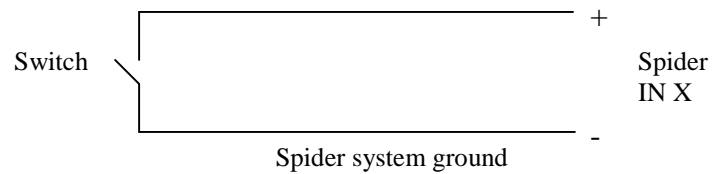
Inputs

Native Inputs

Native inputs are connected to terminals marked INPUT1 through INPUT8. Wiring depends on the type of input selected.

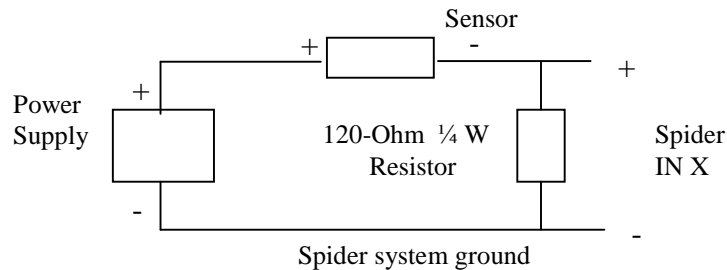


1. “SWITCH”, “COUNTER”, “EVENT”, “DAILY TOTAL”, and “UTILITY METER” types:

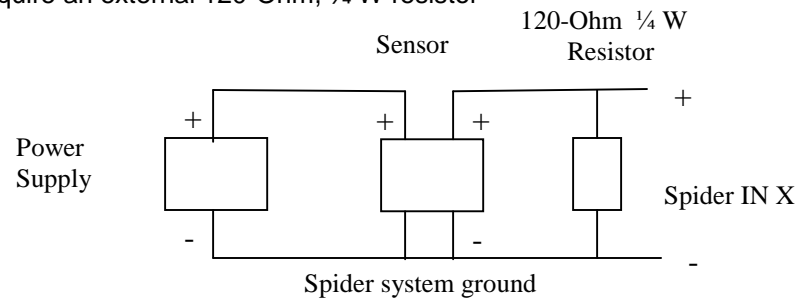


2. "ANALOG" type accepts an analog voltage from 0 – 2.5V.
The following diagrams show wiring details for most common sensor types.

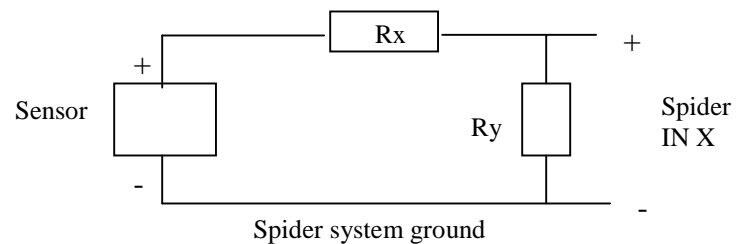
(i) **2-WIRE 0 - 20 mA and 4 - 20 mA** current loop sensors require an external 120-Ohm, ¼ W resistor (supplied):



(ii) **4-WIRE 0 - 20 mA and 4 - 20 mA** current loop sensors require an external 120-Ohm, ¼ W resistor



(iii) **Voltage inputs** may require up to two external resistors:



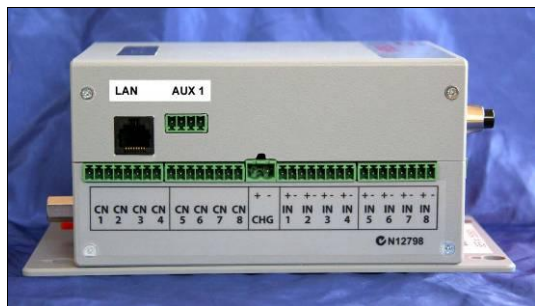
SENSOR RANGE	VALUE OF Rx	VALUE OF Ry
0 – 2.5V	None required	Leave out
0 – 5V	1 Kohm ¼ W metal film	1 Kohm ¼ W metal film
0 – 10V	3.3 Kohm ¼ W metal film	1 Kohm ¼ W metal film

NOTE: You may be able to use the AUX 1 connector to supply the power to the analog sensor. Please refer to *Auxiliary Connectors* on page 28 for more information.

Intelligent Inputs (if installed)

- **SDI-12:** Please refer to *Appendix I: SDI-12 Operation* on page 108 for SDI-12 connection and operation details.

Auxiliary Connectors



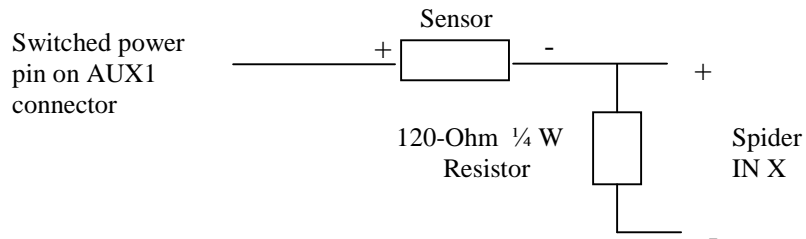
SPIDER AUXILIARY CONNECTORS

A Local Area Network (LAN) connector is used for connections to a PC or LAN.

AUX1 connector can be used to power analog sensors. The leftmost pin (the pin closest to the LAN connector) provides a switched source of power. Power is automatically switched off when the Spider enters the “sleep state”, thus greatly reducing system power consumption. A warm-up period of approximately 4 seconds is provided when the unit re-enters active state.

NOTE: Voltage provided by the power pin on the auxiliary connector will vary based on the source of power (i.e., AC power supply or battery). The pin is able to source up to 500mA of current.

An example of how to connect a two-wire 4-20 mA sensor to the Spider using the switched power pin on the AUX1 connector is shown below:



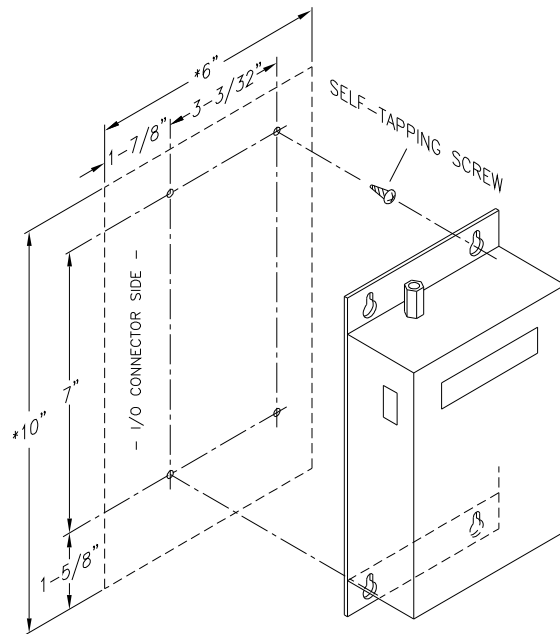
AUX2 connector is not used in a standard Spider. It is reserved for future enhancements and special applications.

Installing a Spider

NOTE: The Spider LP (grey plastic enclosure rate IP20) is suitable for mounting indoors only in environments where limited deviations in temperature or humidity occur. Installing the unit outdoors or in other environments that experience extreme changes in moisture or temperature will void the warranty and could cause unit malfunction or failure. For operating temperatures outside the range of 23 to 122 degrees Fahrenheit, provide heating or cooling devices to maintain proper operating conditions.

The method for installing an ADS Spider depends on the location and environment in which the unit will operate. For indoor installations, mount the Spider directly to a flat wall using appropriate fasteners through the predrilled holes in the unit. The unit has four mounting holes for securing the unit to walls or back panels of enclosures. Refer to the following illustration for preparing a template or drilling pilot holes prior to installation.

*PROVIDE A 6"W x 10"H AREA FOR SPIDER



NOTE: Do not mount the Spider to uneven surfaces. This could distort or possibly break the housing when tightening the fasteners. In addition, when mounting the unit to the wall of an outdoor enclosure, use standoffs to prevent the Spider from absorbing excessive heat from the enclosure (particularly if the enclosure is located in direct sunlight).

For outdoor installations and/or environments in which the Spider requires special protection, first mount the unit inside a suitable weatherproof enclosure (recommended maximum security rating of IP67) and then fit the enclosure with cable glands of a comparable rating for the power, antenna, and I/O cabling.

For either method (mounted on a wall indoors or in an enclosure outdoors), make sure that sufficient clearance exists for connecting and disconnecting inputs. Allow 2 inches on each side between the edge of the unit and the enclosure.

Setting up a Spider for the First Time

NOTE: ADS strongly recommends setting up and testing each Spider in an office environment prior to deploying each unit to the field. This will prevent troubleshooting in potentially noisy and hazardous areas and avoid unnecessary downtime at facilities that require power or shutdown when tying in I/O connections. Refer to *Appendix D: Remote Access Configuration and Quick Start Guide* on page 91 for further recommendations.

Depending on the model, a new Spider must be connected to a GSM/GPRS mobile telephone network. Please refer to *Appendix G: Connection to Mobile Network* on page 102 for details.

Before proceeding, make sure that both the Spider and your computer are set up with correct, matching network parameters. Please refer to *Appendix C: Local Network Configuration* on page 87 and *Appendix D: Remote Access Configuration and Quick Start Guide* on page 91 for details.

A new Spider is shipped from the factory with a default, generic setup. You may wish to change this setup and customize the Spider for your application.

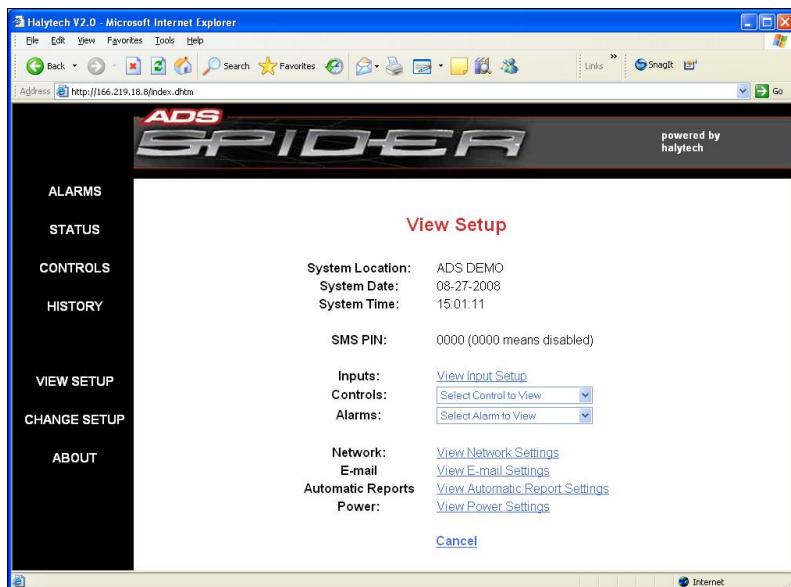
Setting up a Spider involves one or more of the following steps:

1. Setting location
2. Setting date and time
3. Setting your username and password
4. Configuring inputs
5. Calibrating analog inputs (*if present*)
6. Scaling counter and event Inputs (*if present*)
7. Setting control names and optionally programming the timer
8. Setting up alarms
9. Setting up network parameters
10. Setting up e-mail parameters (*if e-mail option is installed*)

Connect to the Spider as described in *Appendix B: Connecting to the ADS Spider* on page 85.

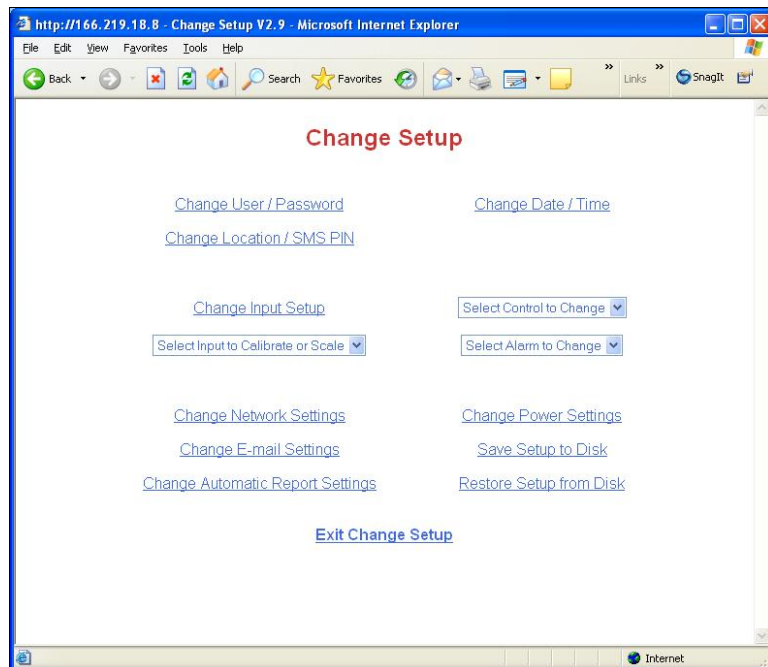
The ALARMS page will be displayed.

Clicking “VIEW SETUP” in the black menu pane on the left will display the following page:



This page allows inspection of all Spider programmable parameters, without making any changes (page may vary from the one above depending on the installed options).

To make changes, click on “CHANGE SETUP” on the black menu pane. A confirmation message will appear. Click “OK” to proceed. The following page will be displayed:



NOTE: The appearance of this page may vary based on the options installed.

NOTE: As indicated by the confirmation message, accessing the “Change Settings” page automatically disables logging, alarm generation, timers, and timer overrides and resets all active alarms. You can ignore the message here because the device is being set up for the first time.

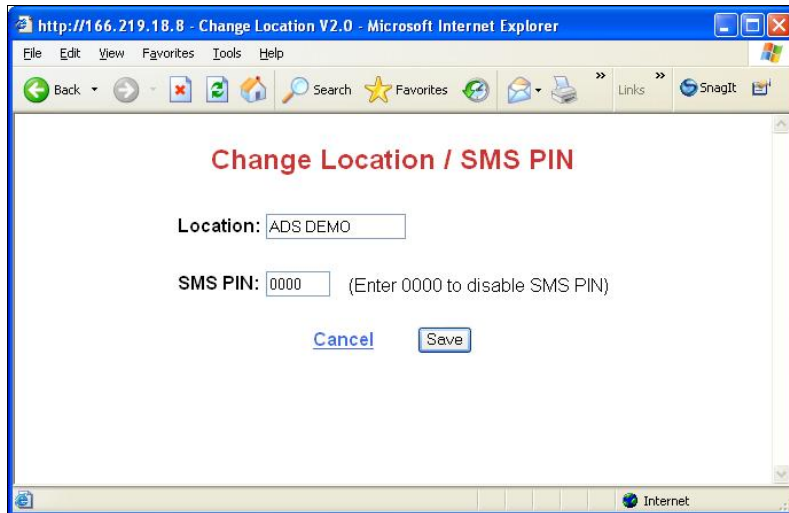
Setting Location

It is important to choose a unique location name for each Spider. The location name is sent at the beginning of each text message and e-mail transmission to identify the particular Spider device.

If not already displayed, access the “CHANGE SETUP” page, as described in *Setting up a Spider for the First Time* on page 32.

Click “Change Location / SMS PIN”

Enter a unique location name for the particular Spider. The name can be up to 16 characters long (for example, “ADS DEMO”). Simply type the name into the space provided.



You can exit at any time without making changes by clicking the “Cancel” link. Save the new value by clicking on the “Save” button.

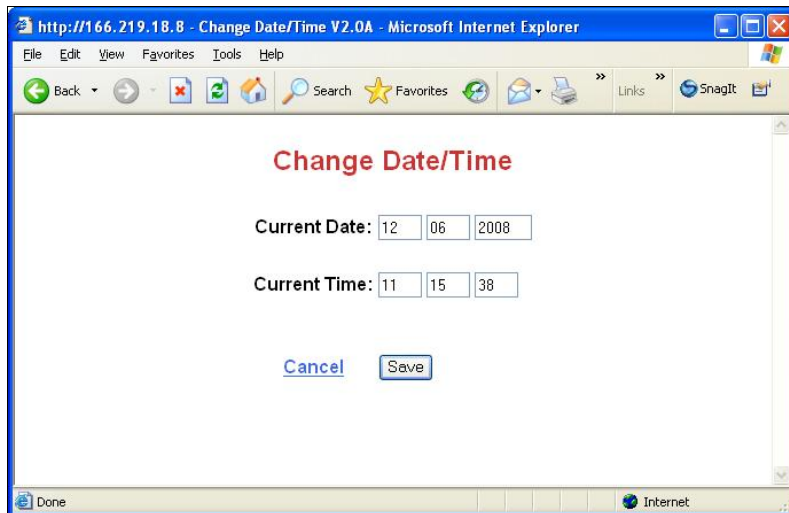
NOTE: This page is also used for entering the PIN for text message control activate/deactivate commands. Please refer to *Text Message Commands* on page 67 for details.

Setting Date and Time

If not already displayed, access the “CHANGE SETUP” page as described in *Setting up a Spider for the First Time* on page 32.

Click “Change Date/Time”.

Confirm that the displayed date and time are correct. To change the date and/or time, simply enter the new values.



You can exit at any time without making changes by clicking the “Cancel” link. Save the new values by clicking on the “Save” button.

Setting User and Password

Only authorized users may access a Spider. To connect to a Spider, you must enter a valid username and password. Failing to enter these prevents all access to the Spider. Similarly, if a valid sequence is entered, but no activity takes place for 10 minutes, access will be revoked and you will have to log in again.

The Spider supports two levels of access. “Administrators” have unrestricted access. “Normal” users can interrogate the device, but cannot make any changes.

Username and passwords are programmable. Factory defaults for an administrator are “user” and “changeme”, respectively; those for the normal user are “user” and “user”. It is strongly advised that these be changed as soon as possible to prevent unauthorized access.

If you forget your new username or password, you will no longer be able to connect to a Spider. Please contact ADS Client Services for assistance at supportcenter@adsenv.com.

To change the usernames and/or passwords, access the “CHANGE SETUP” page as described in *Setting up a Spider for the First Time* on page 32.

Click “Change User / Password”, and then enter the new names and passwords.



The screenshot shows a web browser window titled "http://166.219.18.8 - Change User/Password V2.1 - Microsoft Internet Explorer". The browser's address bar and menu bar are visible. The main content area displays the "Change User / Password" form. The form has a title "Change User / Password" in red. It contains four input fields: "Administrator Name" with the value "user", "Administrator Password" with the value "changeme", "User Name" with the value "user", and "User Password" with the value "user". Below the input fields are two buttons: "Cancel" (a blue text link) and "Save" (a button). The browser's status bar at the bottom shows "Done" and "Internet".

You can exit at any time without making changes by clicking the “Cancel” link.

Save the new values by clicking on the “Save” button.

Configuring Inputs

Decide how your inputs will connect to the Spider.

As described earlier in “Inputs”, every Spider input can be configured in one of the following seven modes: switch closure (digital), analog, counter, event, daily total, utility meter, or disabled.

Switch, counter, event, daily total, and utility meter inputs accept simple ON/OFF sensors. Analog inputs accept a variety of transducers, such as temperature sensors and water level sensors.

For example, you may want to monitor only 3 Inputs. The first two may be switch (digital) types, monitoring operating status of two pumps. The third may be an analog input monitoring a tank level. Assume that “Pump status 1” will connect to Input 1, “Pump status 2” to Input 2, and “Tank level” to Input 3. The remaining 5 inputs will be disabled.

If not already displayed, access the “CHANGE SETUP” page, as described in *Setting up a Spider for the First Time* on page 32.

Click “Change Input Setup”.

Select “Switch” Input Type for the first two inputs and “Analog” for the third. Select “Disabled” for the remaining five inputs. Enter “Pump status 1” as the Input 1 Name, “Pump status 2” as the Input 2 Name, and “Tank level” as the Input 3 Name.

Input #	Type	Name	Units	Logging*	Min. Change To Log*
1	Switch	Pump status 1	-	YES	-
2	Switch	Pump status 2	-	YES	-
3	Analog	Tank level	in	<input checked="" type="checkbox"/>	2
4	Disabled	-	-	-	-
5	Disabled	-	-	-	-
6	Disabled	-	-	-	-
7	Disabled	-	-	-	-
8	Disabled	-	-	-	-

Input #	Type	System Monitors	Units	Logging*	Min Change To Log*
-	System	Battery Charger	-	<input type="checkbox"/>	
-	System	Battery Voltage	V	<input checked="" type="checkbox"/>	0.0
-	System	Unit Temperature	deg F	<input checked="" type="checkbox"/>	0.0

* Switch and Event Inputs are logged automatically when they change
 * Analog Inputs, Counter Inputs and System Monitors checked for change every 30 min

Cancel Save

Switch (digital) inputs are logged automatically when their state changes. A switch input must be stable (i.e., fully on or off) for a minimum of 5 seconds for a new state to be recognized.

Event inputs automatically log every event (or pulse).

Analog and counter inputs allow you to set their measurement units, whether to log the input data, and, if so, the minimum change required for logging to occur. The minimum change for each input works in conjunction with the “Scan period”, which is common to all inputs and is also settable from this page.

Please refer to *Appendix A: ADS Spider Inputs* on page 83 for a summary of input types and their capabilities.

In the previous example, “Tank Level” is measured in inches (“in”). It is checked for changes every 30 minutes and logged if it changes by

more than 2 inches. (If you want to log the level every 30 minutes, regardless of by how much it changes, simply set the minimum change to 0.)

The same page also determines the logging of the 3 System Monitors. These are 3 additional system inputs that monitor the battery charger status, battery voltage, and system temperature. System monitor logging is configured in a similar manner as described above.

You can exit at any time without making changes by clicking the “Cancel” link. Save the new values by clicking on the “Save” button.

NOTE: Please refer to *Appendix I: SDI-12 Operation* on page 108 if you are operating a Spider fitted with an optional SDI-12 interface.

Calibrating Analog Inputs (if present)

Calibrate analog inputs prior to use. The system offers a choice of calibration methods:

1. 2-point calibration
2. Manual calibration

2-Point Calibration

Using the previous example, calibrate a 4-20 mA water level transducer with a 0- to 40-inch range connected to Input 3 using the “2-point” calibration method.

If not already displayed, access the “CHANGE SETUP” page, as described in *Setting up a Spider for the First Time* on page 32. Select “Calibrate Tank level” from “Select Input to Calibrate or Scale”. A page giving calibration choices will be displayed. Select “2-point calibration” and click on “Proceed”.

The following page will be displayed:

Calibrate Tank level

1. Set transducer to minimum value
2. Enter desired reading:
3. [Click here](#) to lock 1st point (raw value =)
4. Set transducer to maximum value
5. Enter desired reading:
6. [Click here](#) to lock 2nd point (raw value =)

[Cancel](#)

Follow the step by step instructions.

NOTE: The two calibration points can represent any two values within the transducer range. However, they must be at least half of the transducer range apart.

You can exit at any time without making changes by clicking the “Cancel” link. Save the new values by clicking on the “Save” button.

Manual Calibration

User inputs are calculated with the following formula:

$$\text{Calibrated value} = \text{Scaler} \times (\text{Raw Value}) + \text{Offset}$$

Manual calibration allows direct entry of the “Scaler” and “Offset” quantities. The same formula is used in the 2-point calibration. The 2-point calibration procedure automatically calculates the “Scaler” and the “Offset”.

Calibrating Counter Inputs (if present)

You can calibrate Counter Inputs in two ways:

1. Scaling
2. Pre-setting the counter to a particular reading

Scaling is useful to make the counters read engineering values. For example, the water meter may be producing one pulse per 5 gallons of water flow. Hence, to make the counter register in gallons, you would set the Scaler to 5.

NOTE: A Spider counts internally from 0 to 99,999 before it “wraps around” to 0. The actual range will be multiplied by the “Scaler”. So, a Scaler of “5” will produce an effective counter range of 0 to 499,995.

It is sometimes required to pre-set the counter to a particular value. For example, you may wish to connect a water meter to a Spider and make the Spider’s starting point the same as the reading on the meter. To manually set the Spider’s starting point; simply enter the required reading in the “Offset” field.

Scaling Event and Daily Total Inputs (if present)

You can scale Counter and Event Inputs by specifying a “Scaler”. A new scaled value obtained by multiplying the raw counter reading by the “Scaler” will be used for all functions, including logging and alarms.

If scaling is not required, simply leave it set to “1”.

To change scaling for an input, first access the “CHANGE SETUP” page, as described in *Setting up a Spider for the First Time* on page 32. Select “Scale <your input>” from “Select Input to Calibrate or Scale”. Enter the new “Scaler” value on the newly displayed page.

You can exit at any time without making changes by clicking the “Cancel” link. Save the new values by clicking on the “Save” button.

Setting Controls

Decide how your controls will connect to the Spider.

For example, you may want to control only 2 outputs. (Spider Controls need not be used sequentially. Unused controls may be interspersed with used controls.)

For this example, assume that “AUX PWR ON” will connect to Control 1. It will be activated manually either via the browser or by sending an text message command to the Spider. Therefore, the timer will not be required for this Control Output.

“SPRINKLER” will connect to Control 2. It will turn on the sprinkler every weekday at 9 AM and turn it off at midday. On weekends, the sprinkler will come on at 6 PM and turn off at 8 PM. The timer will be used for this Control Output.

If not already displayed, access the “Change Settings” page, as described in *Setting up a Spider for the First Time* on page 32.

Select “Change Control 1” from “Select Control to Change”.

Enter “AUX PWR ON” into the “Name:” field, and select the Timer “Off” radio button. (Since the Timer for this control is disabled, you can ignore the timer schedule on the bottom half of the page.)

http://166.219.18.8 - Change Control 1 V2.0 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites Links SnagIt

Change Control 1

Name:

Timer: ON ☐ OFF ☒

Timer Schedule - click hours to turn ON or OFF

	AM											PM												
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tuesday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wednesday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thursday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Saturday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sunday	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

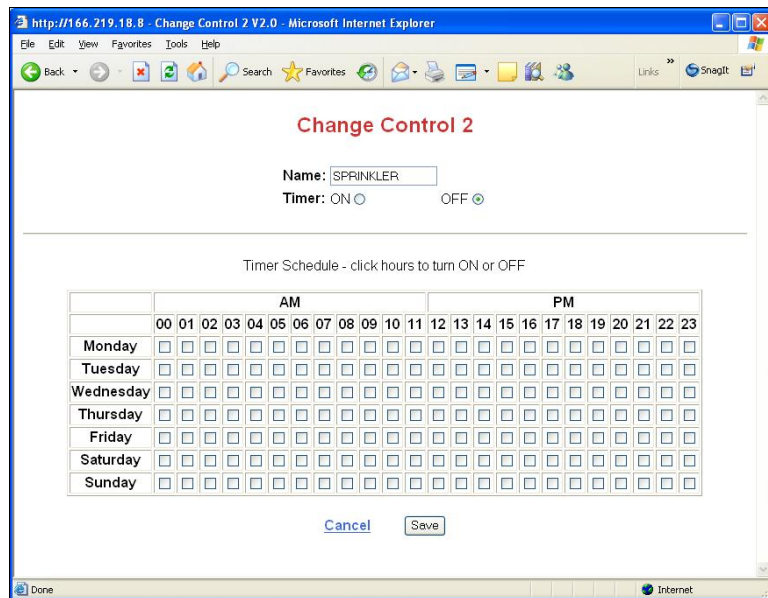
[Cancel](#)

Done Internet

You can exit at any time without making changes by clicking the “Cancel” link. Save the new values by clicking on the “Save” button.

After saving the values for Control 1, select “Change Control 2”.

Enter “SPRINKLER” into the “Name:” field and select the Timer “On” radio button. Program the timer by selecting the boxes representing the times when the sprinkler should be on. To select/deselect a time, simply click on the appropriate square.



Setting up Alarms

Decide how many alarms will be used. Each alarm has a programmable name, a trigger source, a text message, 3 telephone numbers, and the ability to activate or deactivate a control.

E-mail option adds 2 e-mail addresses to the alarm configuration.

Voice option adds 3 voice telephone numbers to the configuration.

For example, set up Alarm 1 as follows (*assuming e-mail and voice options are installed*):

Alarm Name:	Pump 1 fail
Trigger Source:	Pump status 1
Trigger Level:	"ON" (i.e., trigger when source is "ON" or active)
Control Action:	Control 1 ON - continuous
SMS / E-mail / Voice Text:	Pump 1 has failed

Text Messaging: enabled
1st Text Message Phone #: 2564301010
2nd Text Message Phone #: 2564301111
3rd Text Message Phone #: 2564302222

E-mail sending: enabled
1st Email Address: me@somewhere.com

Voice sending: enabled
1st Voice Phone #: 2564301234

If not already displayed, access the “Change Settings” page, as described in *Setting up a Spider for the First Time* on page 32.

Select “Change Alarm 1” from “Select Alarm to Change”. Fill in the form with the details above.

Change Alarm 1

Alarm Name:

Trigger Source:

Trigger Level:

Control Action:

Control Type: ☒ Continuous (default) ☐ 1 second pulse

Send Report: ☒ YES ☐ NO

Message:

Auto Acknowledge: ☒ DISABLED (default) ☐ ENABLED

SMS		E-mail		Voice	
Send?	<input checked="" type="radio"/> YES <input type="radio"/> NO	Send?	<input checked="" type="radio"/> YES <input type="radio"/> NO	Send?	<input checked="" type="radio"/> YES <input type="radio"/> NO
1st Phone Number:	<input type="text" value="2564301010"/>	1st Address:	<input type="text" value="me@somewhere.com"/>	1st Phone Number:	<input type="text" value="2564301234"/>
2nd Phone Number:	<input type="text" value="2564301111"/>	2nd Address:	<input type="text"/>	2nd Phone Number:	<input type="text"/>
3rd Phone Number:	<input type="text" value="2564302222"/>			3rd Phone Number:	<input type="text"/>
SMS acknowledge time:	<input type="text" value="30"/> min				

The “SMS acknowledge time” is the period of time (in minutes) during which an alarm must be acknowledged to stop the Spider from

sending a text message to the next number on the list. It can be set from 0 to 60 minutes.

You can exit at any time without making changes by clicking the "Cancel" link.

Save the new values by clicking on the "Save" button.

NOTES:

1. Trigger source is selected from the drop-down list. This list will display all available inputs identified with their user-programmed names. All unused alarms should be disabled by selecting "DISABLED" from the list.
2. Control action may be specified as continuous or pulsed. For example, the setting "Control 1 ON" in the continuous mode will turn Control 1 on and leave it on. The pulsed mode will turn Control 1 on for approximately 1 second and then turn it off.
3. Enabling "Auto Acknowledge" will automatically acknowledge an active alarm after a user settable amount of time. (In other words, a user need not acknowledge the alarm manually by sending a text message or using a browser.)

NOTE: Even with "Auto Acknowledge" enabled, the alarm will not start sending a new series of messages unless the alarm goes inactive as well.

4. When entering phone numbers, enter **only digits**. Do not use spaces, brackets, or hyphens.
5. If you do not need all 3 telephone numbers or both e-mail addresses, simply leave the appropriate fields blank.
6. Available trigger conditions will change depending on the type of input used to trigger the alarm. For example, while switch (or digital) inputs can trigger on the "ON STATE" or the "OFF STATE", analog inputs will allow triggering on

“ABOVE”, “BELOW”, or a rate of change. Please refer to *Appendix A: ADS Spider Inputs* on page 83 for details on input types and their triggering ability.

7. Alarms can initiate sending of Automatic reports (*if installed*). Please refer to *Automatic Reports* on page 72 in *Advanced Operation* for more information.

Setting up Network Parameters

The Spider can connect to local area networks (LAN) and wide area networks (WAN). LAN connections are primarily used for communication with local computers. The Spider uses WAN connections to access the Internet in order to send e-mails and FTP reports. WAN settings also support Web access when an AT&T static IP address SIM is installed.

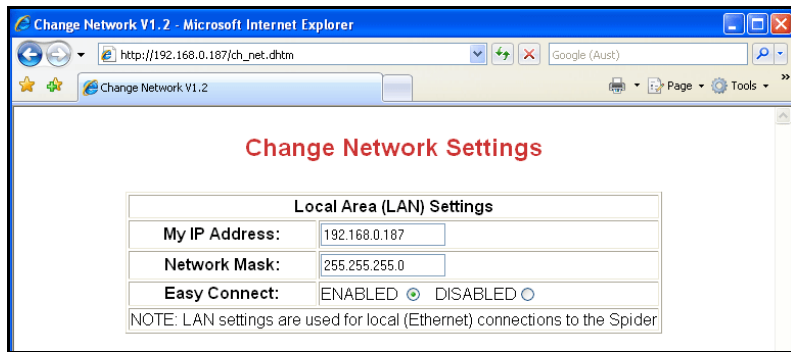
LAN Settings

Please refer to *Appendix C: Local Network Configuration* on page 87 for more information about initial connection of a Spider to a Local Area Network (LAN).

To set up Network parameters, access the “Change Settings” page, as described in *Setting up a Spider for the First Time* on page 32.

Click on “Change Network Settings”.

Fill in the form with details appropriate for your network. You will need to obtain this information from your network administrator.



Easy Connect settings:

- Select “ENABLED” for stand-alone Spiders (Spiders that are not connected to a local area network (LAN))
- Select “DISABLED” for Spiders connected to a local area network (LAN)

NOTE: New settings will take effect after the device is powered down and then powered up again.

WAN Settings (if Web access is required and/or the e-mail option is installed)

WAN parameters must be entered only if you will be accessing the Web and/or sending e-mails or FTP reports.

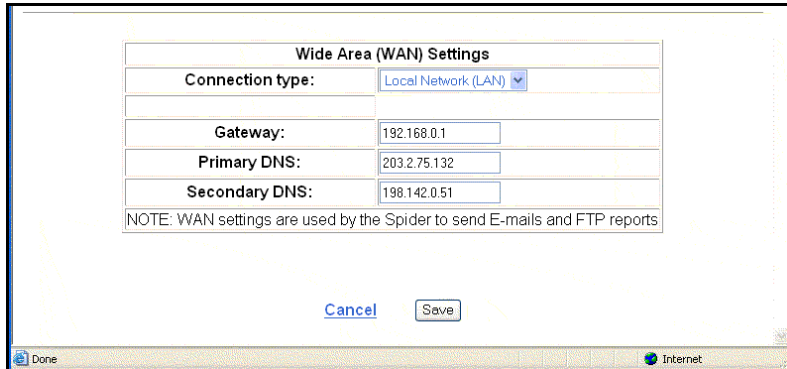
The Spider can connect to the Internet automatically using one of the following methods:

1. Local Area Network (LAN)
2. GPRS Wireless

Select the desired WAN connection method. The page will change accordingly.

LAN

Use this option if the Spider is connected to a LAN that allows Internet access.

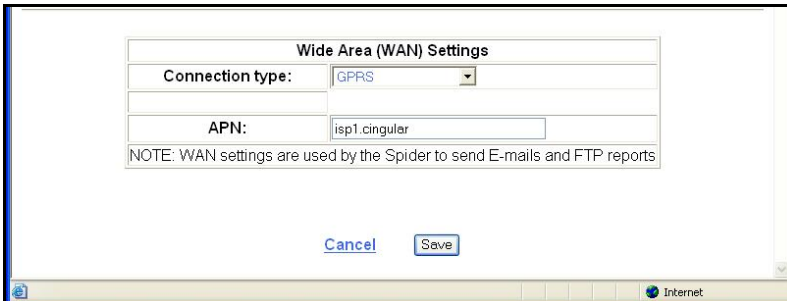


The screenshot shows a 'Wide Area (WAN) Settings' dialog box. The 'Connection type:' dropdown is set to 'Local Network (LAN)'. Below it, the 'Gateway:' field contains '192.168.0.1', the 'Primary DNS:' field contains '203.2.75.132', and the 'Secondary DNS:' field contains '198.142.0.51'. A note at the bottom states: 'NOTE: WAN settings are used by the Spider to send E-mails and FTP reports'. At the bottom of the dialog are 'Cancel' and 'Save' buttons. The window's taskbar at the bottom shows 'Done' and 'Internet' icons.

Obtain the Gateway, Primary, and Secondary DNS from your network administrator.

GPRS

Use this option for remote Spiders fitted with GSM/GPRS wireless modems.



The screenshot shows a 'Wide Area (WAN) Settings' dialog box. The 'Connection type:' dropdown is set to 'GPRS'. Below it, the 'APN:' field contains 'isp1.cingular'. A note at the bottom states: 'NOTE: WAN settings are used by the Spider to send E-mails and FTP reports'. At the bottom of the dialog are 'Cancel' and 'Save' buttons. The window's taskbar at the bottom shows 'Internet' icon.

The wireless provider uses an identifier called an *Access Point Name* (APN) to identify the provider's data network. When the SIM is

delivered, it should include information, such as the phone number, the APN, and other details concerning the services activated for the account (voice, text, data, etc.). APN information will be provided only for accounts that support GPRS (wireless data) traffic. Accounts that only support text messaging and voice services will not include APN information. Following are examples of APNs and supporting functionality:

- **proxy**
 - ☐ **Provider:** AT&T
 - ☐ **Functionality:** Private Dynamic IP Addressing
 - ☐ **Comments:** This is the most common APN used for wireless data services. It only allows the Spider to forward information to email and FTP sites. It does not support Remote Access to the Spider.
- **i2gold**
 - ☐ **Provider:** AT&T
 - ☐ **Functionality:** Public Static IP Addressing
 - ☐ **Comments:** This APN supports Web access to the Spider over the Internet. It assigns a unique Public IP address to the SIM card and allows users to browse to the Spider (*after it receives a text message to enter Remote Access mode*). Users first must order a SIM card with text (*and voice, when necessary*) messaging capability and then submit a request to AT&T to add the *i2gold* APN account.
- **Internet2.voicestream.com or (possibly) epc.tmobile.com**
 - ☐ **Provider:** T-Mobile
 - ☐ **Functionality:** Private IP Addressing
 - ☐ **Comments:** This APN only allows the Spider to forward information to email and FTP sites. It does not support Remote Access to the Spider.

ADS recommends attempting to obtain services through AT&T before soliciting other providers because AT&T offers the widest variety of plans. This would also simplify the task of changing features in the future, as needed, without incurring the expenses involved in transferring between providers.

Additional SIM Information

The Spider can use GSM accounts that provide GPRS access through dynamic IP addresses (*provided by AT&T, T-Mobile, and other providers*) or static addresses (*provided only by AT&T*).

When Dynamic IP address accounts are in use, Web access is not supported. However, reporting can occur through email and FTP posting. Contact ADS Client Services for more information on carriers and their corresponding services, when necessary.

Setting up E-mail Parameters (if e-mail option is installed)

E-mail parameters need to be entered only if you wish to send e-mails.

NOTE: If the customer's IT organization does not allow email relaying through the internal email system, ADS can provide the service to support this requirement.

To set up e-mail parameters, access the "Change Settings" page, as described in *Setting up a Spider for the First Time* on page 32.

Click on "Change E-mail settings". Fill in the form with details appropriate for your network. You will need to obtain this information from your network administrator or your mobile service provider.

Change E-mail Settings

SMTP mail server:

SMTP authentication: ☐ DISABLED (default) ☒ ENABLED

SMTP user name:

SMTP password:

My e-mail address:

Test e-mail address:

[Cancel](#) [Save](#)

Contact your IT department and/or ISP to obtain SMTP server address and authentication information for use with the Spider.

My e-mail address: In the process of sending an e-mail, the Spider must identify itself to the mail host computer with a valid e-mail address. Set this parameter to a known valid address that is acceptable to your mail host. This address is shown in the e-mail as the "From" address.

NOTE: If the e-mail is accepted by the host but cannot be delivered, the failure notice will be sent to this address. If you set this to your own e-mail address, you can monitor e-mails that cannot be delivered.

Test e-mail address: Test e-mails are sent to this address. This is a special feature of the Spider that allows a rapid and user friendly way of setting up and verifying Spider e-mail connectivity.

Please refer to *Appendix H: Testing E-mail Connectivity* on page 106 for details.

SMTP Authentication

Most SMTP servers do not need authentication and, therefore, this field should be left “DISABLED”.

NOTE: If your server does require authentication, select “ENABLED” and enter a user name and a password. You can obtain these from your network administrator.

Network Glossary

The Network and E-mail sections used several networking terms. All of these are standard network parameters used in IT. Detailed explanations are beyond the scope of this document. However, following is a brief explanation of each parameter, noting any special relevance to the Spider implementation:

My IP Address (*): current IP address of Spider. This is the same as the value shown on the LCD display.

Network Mask (*): Network mask. This is the same as the value shown on the LCD display.

Gateway (*): IP address of a computer allowing access from the local network to the Internet.

Primary DNS (*): IP address of the primary domain name server. This server performs translation from domain names (such as “adsenv.com”) to ‘dotted ip’ format (such as “192.168.0.187”).

Secondary DNS (*): IP address of the secondary domain name server. This server performs the same function as the Primary DNS. It is contacted only if there is no reply from the Primary DNS.

SMTP mail server: address of a computer serving as a mail host. The Spider will contact this computer to send the actual e-mail. The

address may be given as a name (such as “mail.somewhere.com”) or as a ‘dotted IP’ address (such as “203.16.222.34”).

NOTE: You must power down and then power up the Spider before the new values marked with (*) take effect.

Save Settings to Disk

Once you have configured a Spider for your application, you can save all the settings on your computer. This is useful as a backup or if you have multiple Spiders and wish to save a “template” that can be uploaded to other Spiders with very similar settings. Then, instead of entering all parameters from scratch, you can simply edit the ones that need to be changed.

To save the settings, simply click on the “Save Settings to Disk” link. The computer will prompt you whether to open or save the configuration. Choose “Save” and, when prompted, enter the name of a file that will hold your settings.

Load Settings from Disk

Once you have saved system settings as described above, you can upload them to any other Spider.

To load the settings, click on the “Load Settings from Disk” link. The computer will prompt you to enter the name of a file containing the settings. Enter the name of the file or select a file anywhere on your computer by clicking on “Browse”.

NOTE: Loading settings from disk will overwrite your current settings.

Exiting Change Settings Mode

Logging, alarm activation, timers, and timer overrides are all disabled while in the change settings mode.

To exit the change settings mode, click the “EXIT CHANGE SETTINGS” link on the bottom of the “Change Settings” page.

This will immediately restart logging, alarm generation, and all enabled timers.

NOTE: Any timer overrides active prior to entering the “Change Settings” page are not re-instated upon exit. Setup change mode is automatically exited after 10 minutes of inactivity.

Normal Operation

Front Panel Display

The Spider is equipped with a two-line display and a one-key keypad. They are used for quick operational checks and basic setup. Their convenience lies in the fact that using them requires no external equipment, such as laptop computers or mobile phones.

Normally, the display shows:

SPIDER
Signal: G65%

“Signal: G65%” indicates the current cellular phone signal strength; the higher the signal number, the stronger the signal. As a rough rule-of-thumb, a value of 25% and above is acceptable. Signal strength is updated every 5 seconds. The “G” preceding the percentage value indicates that GSM is the mobile network used by the Spider.

Value “??” or “—” indicates that there is no mobile phone coverage in the present location, there is no valid SIM card inserted (*GSM models only*), or that the cellular phone module inside the Spider is not responding (possibly because the antenna is not plugged in). It is a normal indication during power-up and immediately following remote access. It typically lasts less than 60 seconds. If, however, this display persists, contact ADS Environmental Services.

During Web access using GPRS communication (i.e., remote access), the display shows:

SPIDER
Remote Access

Different display screens are accessed by briefly pressing the keypad key. Each key press will display a new screen. The following screens are available:

1. Current date and time
2. Current state of inputs
3. Current states of battery charger and battery voltage
4. Current value of system temperature
5. Current state of Alarms 1 – 4 (AL1 – AL4)
6. Current state of Alarms 5 – 8 (AL5 – AL8).
Active alarms are indicated by “Axx”, where xx is the current alarm status code – Please refer to *Text Messaging Alarms* on page 65 for additional information on the status codes.
Inactive alarms are indicated by an “I”.
Disabled alarms are indicated by a “D”.
7. Current state of Controls 1 to 4 (CN1 – CN4). Active Controls are indicated by a “1” and inactive ones by a “0”
8. Current state of Controls 5 to 8 (CN5 – CN8). Active Controls are indicated by a “1” and inactive ones by a “0”
9. Current LAN IP address and IP Mask
10. Sending of test e-mail messages (Refer to *Appendix H: Testing E-mail Connectivity* on page 106 for additional information)

Communicating with a PC

The ADS Spider uses an intuitive, user-friendly, web-browser system. You can use any standard browser on any computer to communicate with the Spider. No special software is required.

Communicating with the Spider involves using common Web browser and website functionality. Information is displayed by clicking links and buttons.

You can connect to a Spider either locally using an Ethernet crossover cable or remotely through Web access (when using static IP addressing). Once connected, operation is identical regardless of connection. The only difference you may notice with a remote connection is a slightly slower response.

Connect to the Spider as described in *Appendix B: Connecting to the ADS Spider* on page 85. A successful log-on will automatically display the Alarms screen.

To communicate with the Spider from a remote location, set up Web access as described in *Appendix D: Remote Access Configuration and Quick Start Guide* on page 91.

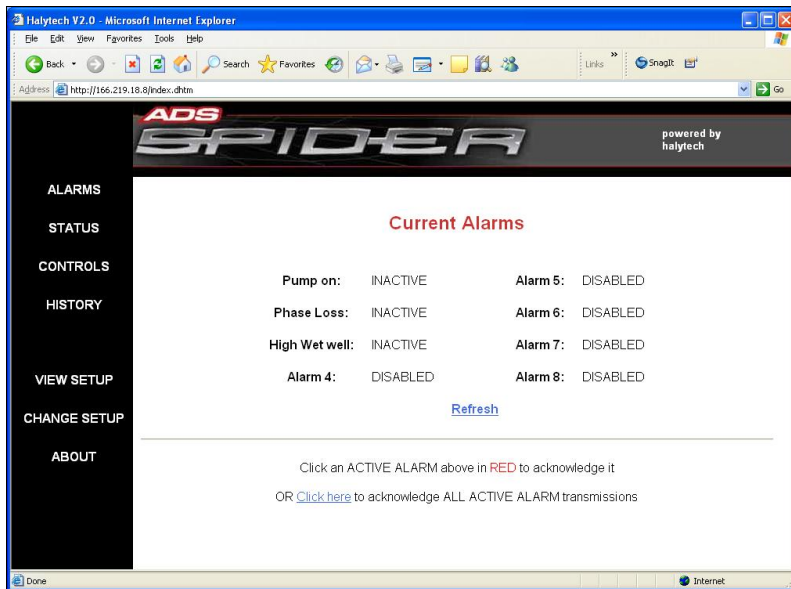
Alarms

Current alarm states are displayed automatically following a successful log-on. The same screen can be displayed at any time by clicking “ALARMS” on the black menu pane on the left.

All alarms are identified by their user-programmed names.

The display shows the state of all alarms at the time the page was displayed. The page automatically updates every 10 seconds.

Active alarms provide additional information about the progress of the alarm sequence by displaying a numerical code. Please refer to *Text Messaging Alarms* on page 65 for the key to the codes.



Acknowledging Alarms

Active alarms can be acknowledged individually by contacting the Spider and clicking the particular alarm.

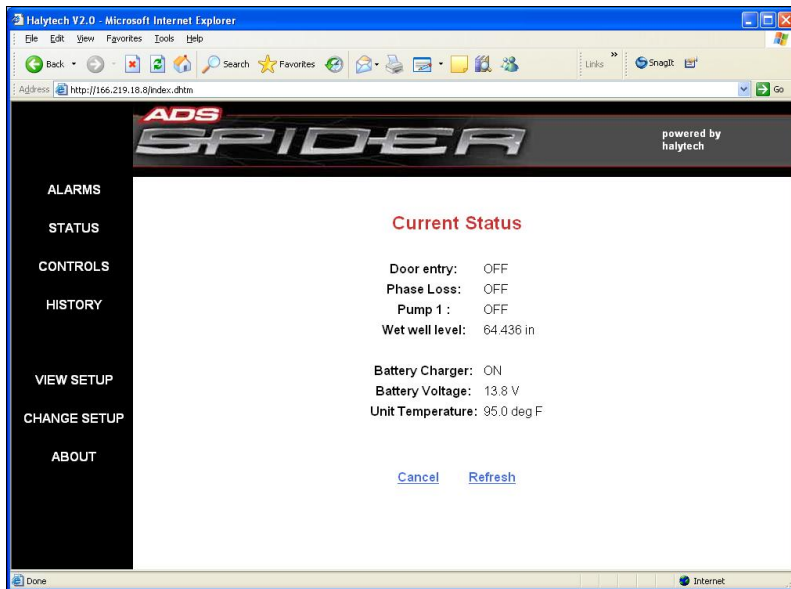
ALL active alarms may be acknowledged at once by clicking on the link at the bottom of the main pane. If there are no active alarms, the command will be ignored.

Alarms with “Auto Acknowledge” enabled will be acknowledged automatically after the set period of time. However, you may still manually acknowledge such an alarm, if desired.

Inputs

Current input states are displayed by clicking “STATUS” on the black menu pane on the left. All Inputs signals are identified by their user-programmed names.

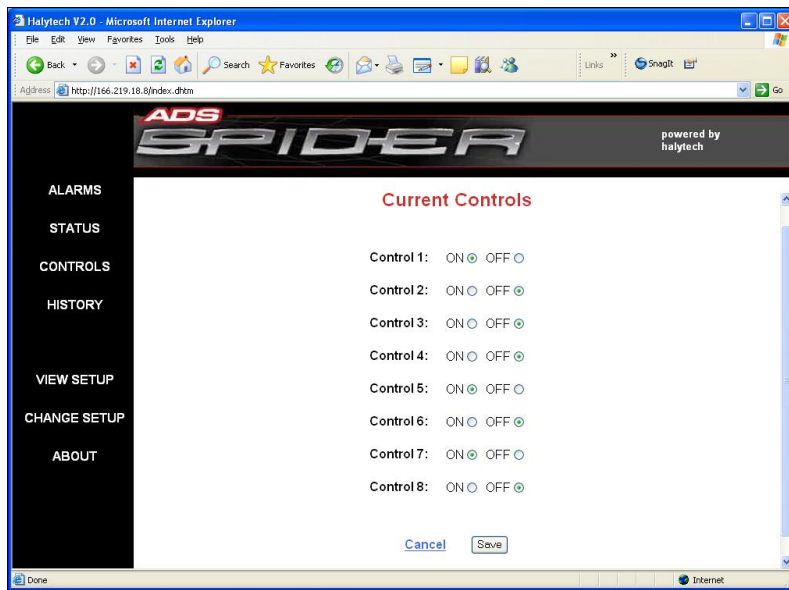
The display shows the state of all Inputs at the time the page was displayed. The page automatically updates every 10 seconds.



Controls

Current Controls and their associated Timer and Timer Override states are displayed by clicking “CONTROLS” on the black menu pane on the left. All Controls are identified by their user-programmed names.

The display shows the state of all Controls at the time the page was displayed. You can change as many outputs at one time as you wish by clicking “ON” or “OFF” selectors as required and then clicking the “Save” button. The page will be updated to reflect the new Control states.



History

The Spider logs the following:

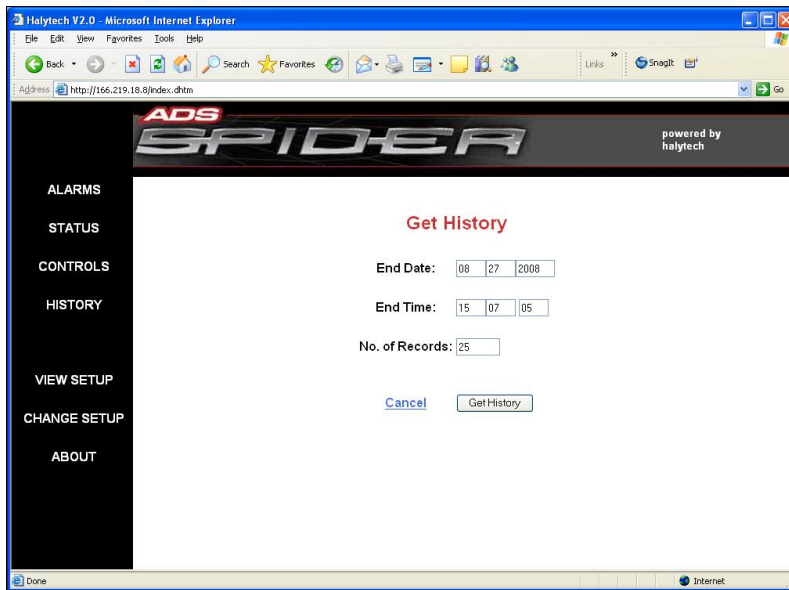
1. Input changes
2. Control changes
3. Alarm activations and resets
4. Text message transmissions and their outcomes
5. Text message command reception
6. E-mail transmissions and their outcomes (*If the e-mail option is installed*)
7. Voice transmissions and their outcomes (*If the voice option is installed*)
8. Daily report outcomes (*If the e-mail option is installed*)
9. System messages

Each log record consists of a date and time stamp to a resolution of 1 second, a numeric record identifier, and short text describing the record. You can selectively download logged data.

Logged data is downloaded by first clicking “HISTORY” on the black menu pane on the left.

Next, specify the period of interest and the number of records to download by filling in the form.

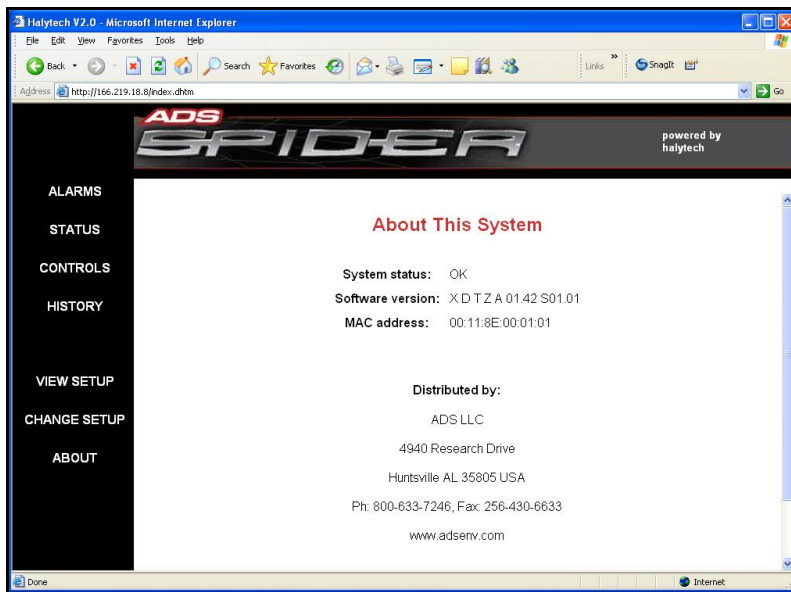
Data is downloaded “backwards” in time. In other words, the most recent records are downloaded first. In order to minimize the amount of data being transferred, you can specify the date and the time of the first record and the maximum number of records to download.



Click the “Get History” button to start the download. Data is downloaded as a “CSV” file.

About

The “About” screen displays system information, such as the software version, and contact information for ADS Environmental Services. Please have this information available when contacting ADS Client Services for assistance.



Text Messaging Alarms

When an input triggers an alarm with text messaging enabled, an alarm sequence will start. The current state of an active alarm is shown on the LCD display and the ALARMS page as a code. The following table provides a description of each individual code:

ALARM CODE	DESCRIPTION
RST	Alarm has been acknowledged, but the trigger source is still active. Trigger source must go inactive before another alarm sequence can be started.
1	Spider is attempting to send 1 st text message to 1 st phone number.
2	Spider is attempting to send 2 nd text message to 1 st phone number.
3	Spider is attempting to send 3 rd text message to 1 st phone number.
4	Spider is attempting to send 1 st text message to 2 nd phone number.
5	Spider is attempting to send 2 nd text message to 2 nd phone number.
6	Spider is attempting to send 3 rd text message to 2 nd phone number.
7	Spider is attempting to send 1 st text message to 3 rd phone number.
8	Spider is attempting to send 2 nd text message to 3 rd phone number.
9	Spider is attempting to send 3 rd text message to 3 rd phone number.
10	Spider has made a maximum of 9 text message send attempts without receiving a reset command. No more send attempts are being made.

Transmitted alarm text messages have the following format:

Location: Text Message content (Send 'RST Alx' to reset)

Where,

“Location” is the programmed Spider location

“Text Message content” is the programmed text message content for this particular alarm

“x” is the particular alarm number (1 – 8)

Therefore, using the examples programmed in *Setting up a Spider for the First Time* on page 32, the first alarm text message will be sent to 2564303366 and will be:

ADS DEMO: Pump 1 has failed (Send 'RST AL1' to reset)

The alarm sequence may be reset simply by replying with the received message (no text entry required!!), replying with **RST AL1**, or by connecting to the Spider with a PC and resetting the alarm.

NOTE: Alarms will be registered while in the Remote Access mode, but text messages will not be sent until Remote Access mode terminates.

Text Message Commands

The Spider can receive and respond to specially coded text message commands. The commands may:

1. Get the current state of all status signals
2. Get the current state of all controls
3. Reset an active alarm
4. Reset all active alarms
5. Activate and deactivate controls - can be protected with a 4-digit PIN
6. Request Daily Report containing all of current day's data (*if e-mail option installed*)
7. Instruct the Spider to come online for a designated number of minutes to allow Web access (*when using AT&T static IP address services*)

The following text message commands are recognized:

Command	Comment	Example
HELP	Request list of supported commands	HELP
GET ST	Get current state of all status signals	GET ST
GET SYS	Get current state of system monitors	GET SYS
GET CN	Get current state of all controls	GET CN
RST ALx	Reset Alarm x (x is 1 – 8)	RST AL6
RST ALL	Reset all active alarms	RST ALL
ON CNx	Activate control x (x is 1 – 8) (no PIN)	ON CN2
yyyy ON CNx	Activate control x (x is 1 – 8) (PIN =yyyy)	1234 ON CN2
OFF CNx	Deactivate control x (x is 1 – 8) (no PIN)	OFF CN4
yyyy OFF CNx	Deactivate control x (x is 1 – 8) (PIN =yyyy)	1234 OFF CN4
PULSE CNx	Pulse control x for 1 second	PULSE CN4

Command	Comment	Example
	(x is 1 – 8)	
yyyy PULSE CNx	Pulse control x for 1 second (x is 1 – 8) (PIN =yyyy)	1234 PULSE CN4
GET REP	Request Daily Report (available only if e-mail option installed)	GET REP

Web Access NOTE: Before access to the Spider is available over the Web, a special text message must be sent to the Spider to wake it up. Refer to *Appendix D: Remote Access Configuration and Quick Start Guide* on page 91 for further instructions and information.

After a Spider receives a text message command, it will interpret the command and act on it. Invalid commands will be ignored. Valid commands will be acknowledged with a return text message:

Location: OK Text Message command

Where,

“Location” is the programmed Spider location

“Text Message command” is the text message command

Therefore, once again using the programmed example, the acknowledgement text message will be:

ADS DEMO STP: OK RST AL1

Control activation and deactivation commands may be protected with a 4-digit PIN. If the PIN is set to “0000”, it is effectively disabled. Any other 4-digit number will enable the PIN. You can change the PIN at any time by accessing the Spider either remotely or locally with a computer and entering the PIN, as described in *Setting Location* on page 34.

NOTES:

1. Commands may be in lower case, upper case, or a combination of both.

2. There must be only one space between the words of a command.
3. Text message commands will be ignored while in the Remote Access mode. Therefore, if a text message command is not acknowledged by a return text message within approximately 1 minute, send the command again after a short period of time.

Voice Option (*if installed*)

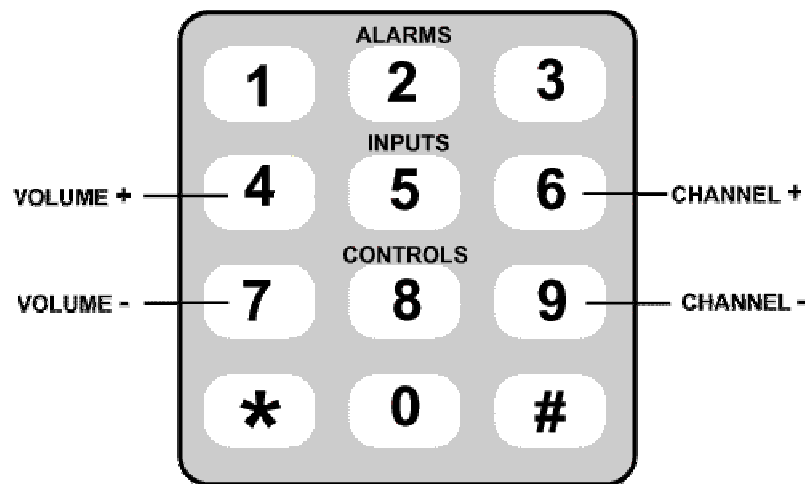
Spider units fitted with the voice option can make and receive calls from any telephone and communicate verbally to the user. The Spider utilizes text-to-speech technology with unlimited vocabulary - requiring no recordings or word downloads. The Spider simply reads what is written.

GSM units only

The communication is intuitive and interactive. The user makes requests through the telephone keypad and the Spider talks back. The keypad commands are arranged in a “TV remote”-like fashion.

Main menu keys 2, 5, and 8 can be pressed at any time to immediately listen to active alarms, inputs, and controls, respectively.

If you want to repeat or skip a reading, simply use the CHANNEL+ (6) and CHANNEL- (9) keys. Volume can be changed with the VOLUME+ (4) and VOLUME- (7) keys.



Calling a Spider (GSM units only)

You can call a Spider from any telephone. Simply dial the Spider's voice number. The Spider will answer the call and identify itself. It will then read the menu. Press the number corresponding to the information you want and listen to the response.

You can hang up at any time.

Voice Alarm Dialling (GSM units only)

If you enabled voice alarm dialling for a particular alarm and the alarm triggers, the Spider will attempt to dial the programmed voice numbers.

If a call is answered, the Spider will identify itself and repeat the programmed alarm message three times.

The user can acknowledge all active alarms and / or request current inputs and controls by pressing the appropriate numbers on the telephone keypad.

Advanced Operation

Automatic Reports (if installed)

The Spider can be set up to automatically send reports. A report can be sent by e-mail and/or by File Transfer Protocol (FTP).

There are 3 types of automatic reports, all operating independently of each other:

- Daily reports
- Periodic reports
- Ad-hoc reports

Daily reports are sent once per day, at a user selectable start time. They contain all the data collected in the previous 24-hour period. For example, if the user sets the Daily report start time to 4:00, the report will contain the data between 4:00 AM the previous day to 03:59 AM on the current day.

Periodic reports can be sent every hour, every 3 hours, every 6 hours, or every 12 hours, as selected by the user. They are always “lined-up” with real time. Therefore, 6-hourly periodic reports will be sent at 06:00, 12:00, 18:00, and midnight. Each report contains the data collected in the previous reporting period.

Ad-hoc reports are initiated by a user text message command or by an active alarm with the “send Report” setting set to “YES”. Ad-hoc reports initiated by alarms contain data collected in the current day. A user can request an ad-hoc report containing data for a single day up to 7 days in the past.

For example, sending the command “GET REP” will request a report with the current day’s data. A command “GET REP3” will request all data collected in the single day, 3 days ago. (Notice that no space exists before the digit ‘3’.)

Each e-mail report has a spreadsheet file attached to it. The file contains all data logged over the applicable period. Reports can be sent to up to three different recipients. Up to three attempts will be made to send an e-mail report. All attempts are logged.

An FTP report automatically delivers the logged data file to an FTP server. Up to three attempts will be made to send an FTP report. All attempts are logged.

Report files are available in two formats: raw and filtered.

Raw format is identical to the Spider logged file format described in *Appendix E: Logged Data Format* on page 96. It contains all logged data including system information, such as reception of text messages, outcome of alarms, and reports.

Filtered format provides data in a simpler form. It contains only logged input data. The filtered file format is described in *Appendix F: Filtered Report File Format* on page 101.

You can also choose the time order in which data is given. Data may be presented in ascending or descending time order.

The Spider makes up to three attempts to send each report – maximizing the transmission success rate even under difficult communications conditions.

Daily reports are provided with “Daily report recovery”. This feature is especially useful for automated data collection systems. If a daily report transmission fails three times, as described above, the next day’s report will contain the data for that day and the previous day. This process is repeated for up to 7 days in the past. The maximum size of this kind of multi-day report is 24,000 records.

To configure daily reports, access the “Change Settings” page, as described in *Setting up a Spider for the First Time* on page 32. Click “Change Daily Report Settings”.

Change Automatic Report Settings

E-mail report		FTP report	
Send?	YES <input checked="" type="radio"/> NO <input type="radio"/>	Send?	YES <input checked="" type="radio"/> NO <input type="radio"/>
1st E-mail address:	john.doe@adsenv.com	FTP server:	
2nd E-mail address:	jim.smith@adsenv.com	FTP username:	
3rd E-mail address:		FTP password:	
		FTP directory:	

Report sending frequency: Every 3 hours + Daily report

Daily report start time: 17 hours after midnight

Report format: Filtered ☒ Raw ☐

Report time order: Increasing ☒ Decreasing ☐

Daily report recovery: Enabled ☒ Disabled ☐

[Cancel](#) [Save](#)

NOTES:

The automatic report function requires configuring both the network and e-mail options correctly. Please refer to *Setting up Network Parameters* on page 48 and *Setting up E-mail Parameters (if e-mail option is installed)* on page 52 for additional instructions.

Automatic report files are named as follows:

NOTE: The date displays in the filename based on the following format: *ddmmyy*.

- a. Daily report:
(first 8 chars of Location)_(date).csv
Example: Location_291205.csv
- b. Periodic report:
(first 8 chars of Location)_(date)_(time of first transmission attempt)P.csv
Example: Location_291205_1105P.csv
- c. Ad-hoc report (for current day):
(first 8 chars of Location)_(date)_(time of first transmission attempt).csv
Example: Location_291205_1105.csv
- d. Ad-hoc report (for x days ago), where x is between 1 and 7:
(first 8 chars of Location)_(date x days ago)_2359.csv
Example: Location_271205_2359.csv

Blanks in the Location part of the filename will be replaced by underscores (_).

Spider Power Options

The ADS Spider is designed specifically for low power, battery-operated applications. The standard battery complemented with a solar panel can provide sufficient power for many months of unattended operation.

Two user-selectable options provide advanced power management for special applications.

IMPORTANT NOTE:

Advanced power settings should only be changed by experienced users. Selecting the “wrong” option can result in an inability to remotely connect to a Spider, drastically reduced battery life, or even complete battery failure.

Always-on Operation

The ADS Spider is normally in the “sleep” state. This state is indicated by a blank LCD display. The system automatically “wakes-up” as required to scan analog inputs, log, receive & send text messages and e-mails, etc. It remains “awake” for the shortest possible time and then goes back to “sleep”.

The main advantage of the LP (Low Power) mode is greatly reduced power consumption and increased battery life. The LP mode is the default mode and recommended for most applications.

The disadvantages of the LP mode are the following:

1. Ethernet (Local Area Network- LAN) port is not available during “sleep”.
2. Analog channels are not scanned during “sleep”.

It is possible to keep the system continuously “awake” by selecting the “Always-on” power mode.

NOTE: Select the always-on mode only for AC-powered applications when continuous LAN access or faster analog input scanning is desired. At all other times, the default LP mode should be used.

To change the operating mode, access the “Change Settings” page, as described in *Setting up a Spider for the First Time* on page 32. Click “Change Power Settings”.

In “System Power:” select “LOW POWER (default)” or “ALWAYS ON” as desired.

Extra Low Power Operation – Modem Scheduling

ADS Spider power consumption may be drastically reduced by scheduling the times during the day when the internal modem is powered up. The modem consumes approximately 90% of the power while the unit is in its normal mode (i.e., when the display is blank).

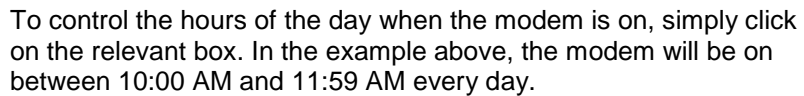
This dramatic improvement in power consumption comes at the cost of the ability to remotely connect to the Spider. Modem scheduling lets you customize your application by finding an optimal combination of remote access times and power consumption.

NOTE: During the scheduled modem OFF times, only remote access is unavailable. Alarm-initiated text messages and e-mail transmissions will operate normally.

Modem scheduling is disabled by default (i.e., the modem is always turned on).

To enable modem scheduling, access the “Change Settings” page, as described in *Setting up a Spider for the First Time* on page 32. Click “Change Power Settings”.

The following page is displayed. (If the “Daily Power Schedule” is not shown, click on “CONTROLLED BY SCHEDULE”.)



Spider units fitted with software versions 1.33 or higher can control other Spiders via text messaging. This is accomplished by using alarms that send specialized text message commands.

ON REMx	- to turn control x on the remote Spider ON
OFF REMx	- to turn control x on the remote Spider OFF
PLS REM x	- to pulse control x on the remote Spider ON and then OFF after 1 second

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As an example, we will consider a system comprising two Spiders. The local Spider is measuring water level. Depending on the water level, the local Spider sends text message commands to the remote Spider to start and stop a pump controlled by the remote Spider.

There is no special setup required for the remote Spider. We will assume that the pump is controlled by CONTROL 3.

Assume that the remote pump should be on when the local water level is below 1 meter (39 inches) and off if the level is at or above 1 meter (39 inches).

Setup a local Spider input to measure the water level.

Set an alarm to perform the pump activation as follows:

Change Alarm 1

Alarm Name: Pump ON

Trigger Source: Water Level

Trigger Level: BELOW 1.000

Control Action: DISABLED

Send Report: YES ☐ NO ☒

Message: On rem3

Auto Acknowledge: DISABLED (default) ☐ ENABLED ☒

Auto Acknowledge Time: 60 minutes

SMS		E-mail		Voice	
Send?	YES <input checked="" type="radio"/> NO <input type="radio"/>	Send?	YES <input type="radio"/> NO <input checked="" type="radio"/>	Send?	YES <input type="radio"/> NO <input checked="" type="radio"/>
1st Phone Number:	0411223344	1st Address:		1st Phone Number:	
2nd Phone Number:		2nd Address:		2nd Phone Number:	
3rd Phone Number:				3rd Phone Number:	
SMS acknowledge time:	3 min				

Cancel Save

Operation

1. When the water level goes below 1 meter (39 inches), the alarm will trigger.
2. The local Spider will send a special message to the remote Spider requesting that the remote Spider's CONTROL 3 be turned ON.

NOTE: The local Spider does not send 'On rem3'; rather, it sends a specially coded command containing its own time, the alarm number, and the desired action.

3. If the remote Spider receives the special command and it is within 10 minutes of its own time, it will turn CONTROL 3 ON. It will then send a response text message to the local Spider acknowledging the command and stopping further sending attempts by the local Spider. Go to step 6.
4. If the remote Spider does not receive the special command or the command is not within 10 minutes of its own time, it will ignore the message but still send the acknowledgement command.
5. The local Spider's text message acknowledgement time is set to 3 minutes. If it does not receive an acknowledgement from the remote Spider within that time, it will re-send the special command. This process is repeated up to 3 times.
6. Auto Acknowledge time on the local Spider alarm is set to 60 minutes. Hence, 60 minutes after the alarm trigger, the alarm will be auto acknowledged (if not already acknowledged by the remote Spider). This will allow the alarm to send a new series of text message commands if the water level goes inactive (above 1 meter (39 inches)) and again goes active (below 1 meter (39 inches)).

The Auto Acknowledge Time of 60 minutes ensures that remote text message commands are not sent more often than every 60 minutes, which could happen with water levels that change quickly.

Using the same logic, setup another alarm on the local Spider to turn the pump off. Its trigger should be Water level ABOVE 1 meter (39 inches) and the Message should be 'Off rem3', with all other settings identical to the alarm described previously.

NOTES:

1. All alarm settings discussed above are only examples. You will need to adjust these as appropriate for your application.
2. The transmitted text message commands are time stamped and acted upon by the receiving Spider only if the reception time is within 10 minutes of the command time stamp. This minimizes the possibility of false commands caused by network delays, text message delivery failures, etc.
3. Reception of all remote text message commands, whether within the allowed period or not, is logged by the remote Spider.

Remote control via text messaging is supported only if both Spiders are fitted with software version 1.33 or higher.

Remote control is supported only with the 'On remx', 'Off remx' and 'Pls remx' text message commands.

Attempting to use remote control with earlier software versions or other commands may result in endless loops, excessive text message transmissions, and very large phone bills!

Software Upgrade

ADS Spider operating software can be upgraded both locally and remotely. Detailed upgrade instructions are provided with new software.

Appendix A: ADS Spider Inputs

INPUT TYPE	LOGGING METHOD	LOGGING RESOLUTION	ALARM TRIGGER CHOICES	TYPICAL USE	COMMENT
SWITCH	AUTOMATIC	Within 5 seconds of change	ON STATE OFF STATE	Switches, Status indicators, level (float) switches	Must be stable for a minimum of 5 seconds. Current state recorded every night at midnight.
EVENT	AUTOMATIC	Within 5 seconds of pulse	RATE OF CHANGE	Tipping bucket rain gauge, any sensor outputting less than 1 pulse per 30 seconds with a minimum pulse width of 0.1 second	Logs time of pulse and pulse counter that rolls over from 99,999 to 0. Current count recorded as a special event every night at midnight
DAILY TOTAL	AUTOMATIC	Within 5 seconds of pulse	RATE OF CHANGE	Tipping bucket rain gauge, any sensor outputting less than 1 pulse per 30 seconds with a minimum pulse width of 0.1 second	Logs time of pulse and pulse counter that rolls over from 99,999 to 0. Current count cleared and recorded as a special event every night at midnight
COUNTER	SIGNIFICANT CHANGE	AS SET BY USER (SCAN PERIOD)	RATE OF CHANGE	Pulse type flow meters, any sensor with a low frequency ($\leq 10\text{Hz}$) output	Counter rolls over from 99,999 to 0. Current count recorded every night at midnight.
UTILITY METER	EVERY SCAN PERIOD	AS SET BY USER (SCAN PERIOD)	RATE OF CHANGE	Water, electricity, or gas meters. Any pulse type meter with a low frequency ($\leq 10\text{Hz}$) output	Each logged data point is the number of pulse in the previous scan period.

INPUT TYPE	LOGGING METHOD	LOGGING RESOLUTION	ALARM TRIGGER CHOICES	TYPICAL USE	COMMENT
ANALOG	SIGNIFICANT CHANGE	AS SET BY USER (SCAN PERIOD)	ABOVE/ BELOW RATE OF CHANGE	Most voltage and current sensors: temperature, pressure, signal strength, etc.	12-bit resolution. Current value recorded every night at midnight.
SYSTEM MONITORS	SIGNIFICANT CHANGE	AS SET BY USER (SCAN PERIOD)	ABOVE BELOW	Built-in system monitors: battery charger status, battery voltage, and system temperature	10-bit resolution. Current value recorded every night at midnight.
DISABLED	-	-	-	-	Disabled inputs are removed from all display screens.

Appendix B: Connecting to the ADS Spider

Local Connection

Ensure that the Spider and your PC have matching network parameters. (Please refer to *Appendix C: Local Network Configuration* on page 87 for details.)

Turn on the Spider by pressing the button on the front panel. The unit must be turned on (i.e., the display must be showing something) before you can establish a local connection.

Connect the Spider to your network. If you want to connect your PC directly to the Spider, you can use the red “cross-over” network cable supplied with the Spider.

Start an Internet browser program, such as “Microsoft Internet Explorer”, on your PC. Type **192.168. 0.187** as the web address, and press the “Return” or “Enter” key. (If you changed the default IP address, as described in *Appendix C: Local Network Configuration* on page 87, then enter the new IP address instead.)

The Spider log-on page will be displayed on your PC. Enter your username and password in the spaces provided. (Default values are “user” and “changeme”, respectively.) Click on the “Log in” button.

The Alarms page will be displayed immediately following a successful log-on. You can now examine other pages as described in “Connecting to a PC”

IN CASE OF DIFFICULTY

If you cannot connect to a Spider, check the following settings in your browser:

NOTE: Although Internet Explorer 6 is described here, other browsers function in a similar way.

1. Disable automatic dialing (In IE6: Tools->Internet Options->Connections, select "Never dial a connection").
2. Disable proxy servers (IN IE6: Tools->Internet Options->Connections->LAN Settings, uncheck "Use a proxy server for your LAN").
3. If you changed any browser settings, quit and restart your browser.

If you still cannot connect to a Spider, refer to *Appendix C: Local Network Configuration* on page 87 for more information.

Appendix C: Local Network Configuration

The Spider uses standard TCP/IP protocols for all communications. No special procedure is required to contact an ADS Spider except to ensure that the Spider and your network and/or PC have matching network parameters.

This Appendix describes the two most common ways of network connection.

Your computer must have a network adapter installed. The following procedure assumes that the adapter is present and installed correctly. If this is not the case, install a network adapter following the manufacturer's instructions.

Connecting a PC Directly to an ADS Spider

The following procedure assumes that the following is true:

- You will be connecting your PC directly to the Spider using the “cross-over” cable supplied.
- “EASY CONNECT” on the Spider is enabled. (Spiders are shipped from the factory with EASY CONNECT enabled.) You can check the setting by pressing the front panel switch repeatedly until the EASY CONNECT page displays.
- Your PC is setup to automatically get an IP address from the network. (Most PCs are set up in this way by default.) You can check this setting by following the AUTOMATIC IP ADDRESS checklist later in this section.

If any of the above are not true, proceed as described in *Connecting to an Existing Network* on page 88 of this Appendix.

Use the supplied red “cross-over” network cable to connect your computer LAN port to the Spider LAN port.

Turn on the Spider by pressing and holding the button on the front panel for two seconds. The unit must be turned on (i.e., the display

must be showing something) before you can establish a local connection.

Start an Internet browser program such, as “Microsoft Internet Explorer”, on your PC. Type **192.168.0.187** as the web address, and press the “Return” or “Enter” key.

The Spider log-on page will be displayed on your PC. Enter your username and password in the spaces provided. (The default values are “user” and “changeme”, respectively.) Click on the “Log in” button.

The Alarms page will be displayed immediately following a successful log-on. You can now examine other pages.

Automatic IP Address Setting Checklist for Your PC

1. Click on “Start”->”All Programs”->”Accessories”->”Communications”->”Network Connections”.
2. If, in the newly opened window, you do not have an item called “Network Bridge”, go to step 3.
If you do, right click on it and select “Properties”. Go to step 4.
3. Right click on the item “Local Area Connection” and select “Properties”.
4. Near the bottom of the new window, click on “Internet Protocol (TCP/IP)” and then click on “Properties”.
5. Select “Obtain an IP address automatically”.
6. Select “Obtain DNS server address automatically”.
7. Click OK.
8. Click OK.
9. Close the Network Connections window.

Connecting to an Existing Network

Before connecting the Spider to an existing LAN, contact your network administrator and obtain a free static IP address and a corresponding mask.

Change the Spider default IP address and mask to the new values as follows:

1. Keep on briefly pressing the keypad key until the display shows:
I192.168.000.187
M255.255.255.000
2. Press the keypad key and hold it down for more than 3 seconds. Release the key. The display will show:
Change IP addr ?
192.168.000.187
3. Press the keypad key and hold it down for more than 3 seconds. Release the key. A flashing cursor will appear over the first digit on the second line.
4. A brief key press will increment the digit under the cursor, while a long press (longer than 3 sec) will move the cursor to the next digit.
5. After the last digit is entered, the display will show the message in step 2 again.
6. Briefly press the key. The display will show:
Change net mask?
255.255.255.000
7. If you need to change the mask, enter the change mode with a long press and then change digits in the same manner as described in Step 4 above.
8. After the last digit is entered, the display will show the message in step 6 again. Briefly press the key until the display shows:
Save ?
9. A long press will save the new values for the IP address and mask and return the display to normal operation.
10. If you change your mind and do not want to change the values, exit the change mode (indicated by the flashing cursor) by waiting for 20 seconds and then briefly pressing the key until the display shows:
Cancel ?
A long press now will cancel all changes and return the display to normal operation.
11. You must power down and then power up the Spider for the new values to take effect.

You can connect the Spider to your network with a standard RJ-45 network cable. Cables of various lengths are available from most electronics and computer retailers.

NOTE: Do not use the red crossover cable supplied by ADS to connect to the LAN.

Once the Spider is connected to the LAN, you can connect to it from any computer on your network, as described in *Local Connection* in *Appendix B: Connecting to the ADS Spider* on page 85.

NOTE: You should also disable the EASY CONNECT network setting on the Spider, as described in *Setting up Network Parameters* on page 48.

Appendix D: Remote Access Configuration and Quick Start Guide

This appendix provides brief instructions on setting up the Spider for communication and testing communications performance prior to deploying the unit to the field.

NOTE: The following information pertains only to remote access using *static* IP addressing. Therefore, when testing wireless services involving *dynamic* IP addressing, ignore the *Remote Access* section.

Remote Access

Remote Access, *also referred to as Web access*, is a communication feature available when using a Public *static* IP address SIM card. Using a Public static IP address, the user can access the Spider over the Internet through any browser. The only information required for access to the Spider is the IP address, username, and password.

The Remote Access feature is not intended for enabling the user to remain online with the Spider to monitor input values real-time; however, the Spider can be used for this purpose for limited time periods. ADS provides this feature primarily as a maintenance tool to eliminate site visits for changing alarm settings, control set points, automatic report setup, or other configuration parameters. It also allows the user to request current reports of logged data and control (*turn on and off*) outputs real-time.

NOTE: Remaining online with the Spider through Remote Access prevents the units from sending out alarms. Therefore, do not maintain continuous contact with the Spider over the Internet for extended periods of time.

SIM Installation

The first step involves inserting the SIM into the modem. Please insert the SIM into the modem gently to avoid slipping it into the modem housing. Carefully review the images on the attached SIM

installation procedure. ADS strongly recommends holding the SIM with a small pair of needle-nose pliers while inserting it into the modem. **However, be very careful to avoid contacting or denting the copper contacts on the card with the pliers.** In addition, pay special attention to the corner bevel on the SIM card, as shown in the installation procedure.

Unit Activation

After installing the SIM, power up the unit and check the wireless signal strength in the following way:

1. Connect the antenna and position it next to a window or wall.
2. Connect the backup battery to the BATT receptacle (*not required for this test*).
3. Connect the power supply (i.e., charger *or* AC Adapter) to the CHG receptacle.
4. Plug the power supply into a wall outlet.
5. Wait a minute for the wireless modem to log onto AT&T and display the percent signal strength.

Network and Email Setup Screen Configuration

After verifying a good signal strength (25% or more), establish communication with the Spider using a laptop and Ethernet crossover cable to setup network and Email parameters (refer to the screen shots below). Once these parameters are setup, refer to the Remote Access Procedure to establish communication with the unit over the Internet. If the Spider is not using a SIM with a static IP address, follow the instructions included in *Appendix H: Testing E-mail Connectivity* on page 106.

Network Settings – After connecting to the unit, access the Change Setup/Change Network Settings page and set up the parameters as shown in the following screen (*except for the APN*). Modify the “APN” to match the designation provided with the SIM card.

Change Network Settings

Local Area (LAN) Settings	
My IP Address:	192.168.0.187
Network Mask:	255.255.255.0
Easy Connect:	ENABLED <input type="radio"/> DISABLED <input type="radio"/>

NOTE: LAN settings are used for local (Ethernet) connections to the Spider

Wide Area (WAN) Settings	
Connection type:	GPRS
APN:	i2gold

NOTE: WAN settings are used by the Spider to send E-mails and FTP reports

[Cancel](#)

Email Settings – After connecting to the unit, access the Change Setup/Change Email Settings page and set all the parameters as shown in the following screen (*except for the Test e-mail address*). Set the “Test e-mail address” to any Test address desired.

Change E-mail Settings

SMTP mail server:

SMTP authentication: ☒ DISABLED (default) ☐ ENABLED

SMTP user name:

SMTP password:

My e-mail address:

Test e-mail address:

[Cancel](#)

After the settings are saved and the unit confirms carrier connection, test the email function by accessing the Test Email LCD screen on the Spider and holding down the button for 5 seconds. The Spider will produce a test message and display *Success* after sending or *Failure* if problems occurred. Refer to the troubleshooting section for assistance, when necessary.

Remote Access Procedure

To wake up the Spider to receive incoming Internet connections, send a text message containing the following text to the Spider's phone number: GPRS10. This instructs the Spider to wake up for 10 minutes to wait for an IP-based connection. However, enter any value from 1 to 30 for the waiting period. The unit will not disconnect from the user while the user is online with it; however, the unit will disconnect after the designated number of minutes if the user closes the browser and disconnects.

NOTE: Keep in mind that the Spider cannot send out alarms via text, voice, or email during Remote Access.

To connect to the unit after wakeup, use a PC with an Internet connection. Open the browser and simply enter the IP address of the SIM card in the Spider. The Spider will respond with a login screen, requesting the User Name and Password. Enter *user* (*all lower case*) for the “User Name” and *changeme* (*all lower case*) for the “Password”. This establishes communication with the unit and displays the same screens as a local connection.

Appendix E: Logged Data Format

The Spider logs data internally in an efficient binary format.

The internal binary format is converted into a standard “CSV” (Comma Separated Values) file before each download. A CSV file is readable by most spreadsheet and database programs. This appendix provides information about the structure of the “CSV” file.

Each record in the file consists of four fields:

1. record date (e.g., 11/29/07)
2. record time (e.g., 12:34:15)
3. record numeric identifier
4. record text description or, in the case of analog and counter inputs, the value of the input

The following table lists all possible values for the numeric identifier and the text fields:

Numeric Identifier	Range	Text	Comment
32768	32768	New File	New log file created
32769	32769	NORML ST	Normal program start
32770	32770	PHONE ST	Phone program start
32771	32771	MODM ON	Modem came on-line
32772	32772	MODM OFF	Modem went off-line
32773	32773	RING DTC	Incoming ring detected
0 + IN#	0 – 10	Numeric value of analog / system input	Analog / system input log record
20 + IN#	20 - 27	Numeric value of counter input	Counter input log record
50 + 2*IN# +	50 – 65	STx=y	Digital input change

Numeric Identifier	Range	Text	Comment
STATE			
80 + IN#	80 - 87	Numeric value of event counter at the time of the event	Event input log record + event counter
100 + 2*CNT# + STATE	100 – 115	CNx=y	Control change
140 + IN#	140 - 147	Numeric value of event counter at midnight	Event input midnight check (no event occurred)
160 + IN#	160 - 167	Numeric value of daily rain total at the time of the event	Daily rain input log record + total
180 + IN#	180 - 187	Numeric value of daily rain total at midnight	Daily rain input midnight check (no event occurred)
200 + AL#	200 – 207	Alarm x	Alarm activation
280 + AL#	280 - 287	Almx RST	Alarm reset
300 + 10*AL# + SEQ	300 - 379	SMSxy OK	Text message alarm transmission OK
500 + 10*AL# + SEQ	500 - 579	SMSxy NG	Text message alarm transmission failed
700 + AL#	700 – 707	SMS ALxK	Text message command – acknowledge an alarm

Numeric Identifier	Range	Text	Comment
718	718	SMS ALLK	Text message command – acknowledge all active alarms
719	719	SMS AL?K	Text message command – acknowledge an invalid alarm #
720 + 2*CNT# + STATE	720 – 735	SMS CxOF or SMS CxON	Text message command – (de) activate a control
758	758	SMS BPIN	Text message command – (de) activate a control – invalid PIN
759	759	SMS C?OF or SMS C?ON	Text message command – (de) activate a control – invalid control #
760	760	SMS GTST	Text message command – get inputs
761	761	SMS GTCN	Text message command – get controls
762	762	SMS HELP	Text message command – get help
763	763	SMS GTSY	Text message command – get system inputs
764	764	SMS GTRP	Text message command – get daily report

Numeric Identifier	Range	Text	Comment
797	797	SMS ROK	Text message command acknowledgement sent OK
798	798	SMS RNG	Text message command acknowledgement send failed
799	799	SMS ?????	Unknown Text message command
800 + 2*CNT# + STATE	800 – 815	RMG CxOF or RMG CxON or RMG CxPL	Text message remote command – (de) activate a control
820 + 2*CNT# + STATE	820 – 835	RMB CxOF or RMB CxON or RMG CxPL	Text message remote command – (de) activate a control – outside allowable time
860 + CNT#	860 – 867	SMS CxPS	Text message command – pulse a control
900 + IN#	900 – 907	Numeric value of utility meter input	Utility meter input log record
1000 + 10*AL# + TRY	1000 - 1073	EMLxz OK	e-mail sent OK
1200 + 10*AL# + TRY	1200 - 1273	EMLxz NG	e-mail sending failed
1300 + TRY	1300 - 1302	EMREP OK	Automatic e-mail report sending successful
1310 + TRY	1310 - 1312	EMREP NG	Automatic e-mail report sending failed
1320 + TRY	1320 - 1322	FREP OK	Automatic FTP report sending successful

Numeric Identifier	Range	Text	Comment
1330 + TRY	1330 – 1332	FREP NG	Automatic FTP report sending failed
1600 + 10*AL# + TRY	1600 - 1673	VOCxz OK	Voice alarm sent OK
1800 + 10*AL# + TRY	1800 - 1873	VOCxz NG	Voice alarm sending failed

Table Decode:

IN# - input number:
 0 – 7 are user inputs
 8 is battery charger status
 9 is battery voltage in V
 10 is system temperature in deg C

STATE - digital input state (0 = OFF, 1 = ON)

CNT# - control number (0 – 7)

AL# - alarm number (0 – 7)

x - alarm number (1 – 8) (equals AL# + 1)

SEQ - alarm sequence step (0 – 10)

y - alarm sequence number (1 – 9 (equals SEQ + 1)

TRY - e-mail sending attempt (0 – 2)

z - e-mail sending attempt (1 – 3) (equals TRY + 1)

Appendix F: Filtered Report File Format

The filtered file format is a simplified version of the logged file. It contains only logged input values in a standard “CSV” (Comma Separated Values) format. A CSV file is readable by most spreadsheet and database programs.

This appendix provides information about the structure of the “CSV” file.

Each record in the file consists of four fields:

1. input name (e.g., Temperature)
2. record date and time (e.g., 23-Jan-06 13:00:00)
3. input value (e.g., 123.445)

Appendix G: Connection to Mobile Network

The Spider is equipped with an internal GSM/GPRS modem. However, the user must supply a SIM (Subscriber Identity Module) card for each Spider to use wireless services. While AT&T and T-Mobile are the main providers of GSM/GPRS services in the U.S., many other providers offer the same services. All of these other providers are resellers of the services offered by AT&T and T-Mobile.

Obtain the following services from the wireless provider:

NOTE: Depending on the wireless alarming capabilities provided with the Spider, the user will need to order the proper GSM services to ensure full use of the unit's communications capabilities.

- **Text Messaging:** All Spider units support standard text messaging (i.e., SMS), so the account must include this service (at a minimum).
- **Voice Services:** For applications involving voice alarms, the account must include normal GSM voice services.
- **GPRS (Data) Services:** These wireless data services are required for all Spiders equipped for using email or FTP posting to deliver alarms and reports. GPRS data services fall into two categories based on the method of IP addressing.
 - ❑ **Dynamic Addressing** – This is the most common type of GPRS service offered by GSM wireless data providers. When the Spider is powered up, the network assigns an IP address to the SIM card. This address periodically is changed at the provider's discretion. It also is *private* and, therefore, cannot be accessed over the Internet. The Spider can only send messages or data out; it cannot view any incoming connection requests. Dynamic addressing is commonly used by hand-held products, such as Blackberrys and iPhones. It will support all Spider e-mail and FTP functions; however, it will not support Web access.

- ❑ **Static Addressing** – This type of GPRS service supports Web access. The provider supplies and assigns a dedicated public IP address to the account, which enables the user to access the Spider at any time over the Internet (Refer to *Appendix D: Remote Access Configuration and Quick Start Guide* on page 91). Order SIM cards with static IP addresses from AT&T by requesting I2GOLD service. However, to obtain a static IP address through I2GOLD, the user first must have an account (i.e., wireless number) created and then request the addition of I2GOLD APN.

While municipalities typically order SIM cards directly through their AT&T government representative, ADS can assist customers with the ordering process. However, ADS cannot order or open accounts on the customers behalf. Please contact ADS Client Services for assistance, when necessary.

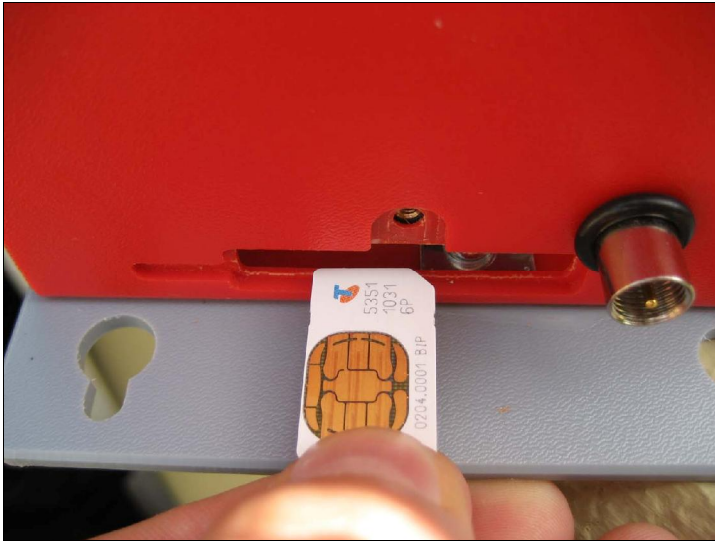
SIM Card Insertion and Removal

Insert the SIM into a Spider as follows:

1. Locate the modem access cover located on the top of the Spider case, next to the antenna connector. Using a small Phillips screwdriver, undo the single screw and gently pull out the cover. The modem inside the Spider will now be visible through the exposed access slot.

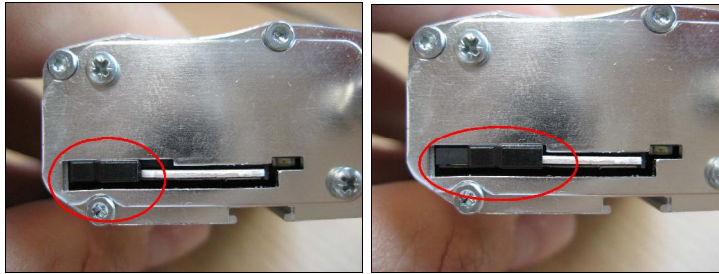


2. Looking through the slot, you will see the SIM card slot with a black locking lever to the left of it. Holding the SIM card level with the locking lever, gently push the SIM card into the exposed slot until it locks in place. The notched end should be inserted first, with the gold contacts facing up (as shown in the illustration).



IMPORTANT NOTE: You should feel slight resistance while pushing the card into the slot. If you do not or you can freely move the SIM from side to side by more than 1 mm, you have missed the slot. You must remove the SIM and try again.

3. Using a small, flat screwdriver, slide the locking lever to the right – as far as it will go.



UNLOCKED POSITION

LOCKED (WORKING) POSITION

4. Replace the access cover.

To Remove the SIM Card:

1. Remove the modem access cover as previously described
2. Using a small, flat screwdriver, slide the SIM locking lever to the left as far as it will go.
3. Gently push the SIM card into the modem. It will unlock and partially pop out.
4. Pull out the SIM card completely.

Appendix H: Testing E-mail Connectivity

Spider units fitted with e-mail options provide a quick and simple way of confirming proper e-mail operation.

You can send test e-mails at any time using the built-in keypad and display. E-mails are sent to the “Test e-mail address”, as configured in the “E-mail Settings” browser screen.

Sending Test e-mails

Once you set up a new Spider and enter all required Network / E-mail parameters, ensure that it is connected to the appropriate network as selected by the e-mail sending method. Repeatedly and briefly press the keypad key until the display shows:

Send test email?

Press and hold the key for longer than 3 seconds. The unit will display:

Sending email...

The keypad will not respond to key presses while the message above is displayed. After a period of time (usually less than 30 seconds), the following outcome will display:

Email sent OK ! OR Email failed !

A successful outcome verifies full e-mail connectivity. Otherwise, you may wish to Monitor Test e-mails to find the reason for the failure.

Monitoring Test E-mails

Equipment required:

1. Spider with e-mail option, with initialized Network / E-mail settings, and connected to the appropriate network (LAN or mobile network)
2. PC running a terminal program, such as HyperTerminal
3. Crossover serial cable

Procedure:

1. Set your terminal program to 9600 bps, 8 data bits, 1 stop bit, and no parity.
2. Connect your PC serial port to the Spider AUX2 port (the DB-9 connector on the outside of the enclosure) using the crossover serial cable.
3. Send a test e-mail as described above in "Sending Test e-mails". Your PC will display diagnostic messages for each step of the sending process. The last message will usually indicate where the problem lies.

Most diagnostic messages are self-explanatory. Here are some additional tips:

- "Unable to resolve 'your smtp host address'" message when using LAN e-mail sending method. Ensure that the gateway and the primary and the secondary DNS are set correctly and that there is connectivity to the internet or to your SMTP mail host computer.
- Messages starting with 3-digit numeric codes are generated by the SMTP host computer and will indicate invalid sender, recipient, etc. Your network administrator or ISP can supply the correct settings.

Appendix I: SDI-12 Operation (*if SDI-12 interface is installed*)

SDI-12 Sensor Preparation

Do not connect your SDI-12 sensor to the Spider at this time.

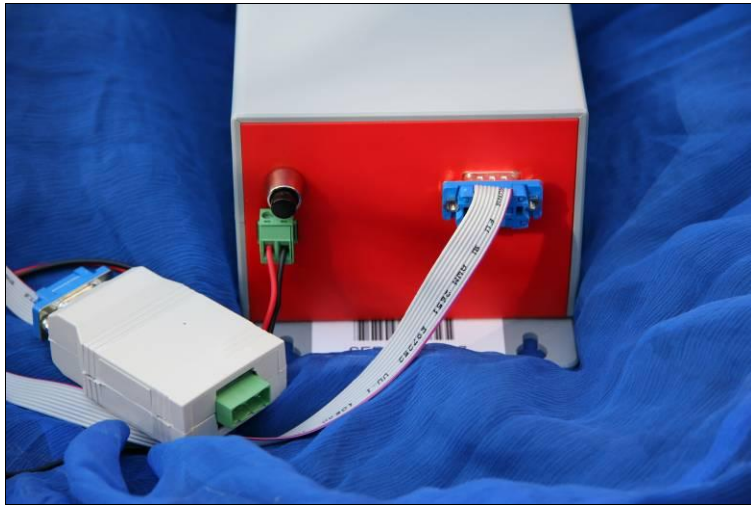
Refer to your SDI-12 sensor Instruction Manual and set up the sensor as follows:

- Enable your sensor's SDI-12 Interface
- Assign SDI-12 address 0 to the sensor
- Select a suitable SDI-12 delay (warm-up) time and record it for future use
- Determine the number of parameters provided by the sensor and the order in which they are given. Once again, record this information for future use.

For example, assume that you are using a popular water quality instrument providing eight parameters in this order: temperature, pH, specific conductivity, salinity, ORP, depth, turbidity, and LDO. You decide to use a delay (warm-up) period of 30 seconds.

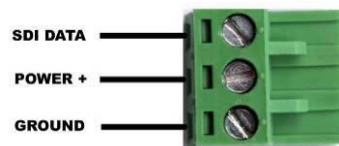
SDI-12 Physical Connection

The SDI-12 interface is a separate electronics module. It connects to the Spider LC via two cables: a ribbon cable and an integral power cable. The ribbon cable connects to the Spider's AUX2 port, and the power cable connects to the Battery Connector. Following is an illustration of a typical connection:



NOTE: If you are using an optional external rechargeable battery, simply connect the battery across the same terminals. Observe the correct polarity (+ terminal is on the left when viewing the unit as shown in the illustration).

Attach the supplied SDI-12 connector to your sensor cable, as shown in the following image:



Plug the sensor cable into the Spider's SDI-12 interface.

SDI-12 Input Setup

If not already displayed, access the “CHANGE SETUP” page, as described in *Setting up a Spider for the First Time* on page 32.

Click “Change Input Setup”. The following page will be displayed. Enter the information recorded in *SDI-12 Sensor Preparation* on page 108.

TIP: Add 3 seconds to the sensor warm-up time. In our example, the sensor warm-up was set to 30 seconds; we will enter $30+3 = 33$ seconds onto the web page.

Change Input Setup

Input #	Type	Address	Name	Units	Warmup	Logging	Min. Change To Log
1	SDI-12	Addr 0, Para 1	Temp	Deg C	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000
2	SDI-12	Addr 0, Para 2	pH	pH	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000
3	SDI-12	Addr 0, Para 3	Sp Cond	ms/cm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000
4	SDI-12	Addr 0, Para 4	Sal	ppt	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000
5	SDI-12	Addr 0, Para 5	ORP	mV	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000
6	SDI-12	Addr 0, Para 6	Depth 25m	m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000
7	SDI-12	Addr 0, Para 7	Turb	NTU	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000
8	SDI-12	Addr 0, Para 8	LDO %	% Sat	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.000

Input #	Type	Address	System Monitors	Units	Warmup	Logging	Min Change To Log
-	System	Internal	Charger	-	-	<input type="checkbox"/>	
-	System	Internal	Battery	V	-	<input checked="" type="checkbox"/>	0.0
-	System	Internal	System Temperature	deg C	-	<input type="checkbox"/>	

* Sensor Warmup Period - applies to all inputs with warmup enabled sec

* Switch and Event Inputs are logged automatically when they change

* Analog Inputs, Counter Inputs and System Monitors checked for change every min

[Cancel](#) [Save](#)

SDI-12 inputs allow you to set their measurement units, whether to log them, and (if logging) the minimum change required for logging. Warm-up is automatically selected for all SDI-12 inputs.

The minimum change for each input works in conjunction with the “Scan period”, which is common to all inputs and settable from this page.

The same page also determines the logging of the 3 System Monitors. These are 3 additional system inputs that monitor the battery charger status, battery voltage, and system temperature. System monitor logging is configured in a manner similar to that described above.

You can exit at any time without making changes by clicking the “Cancel” link. Save the new values by clicking on the “Save” button.

NOTES:

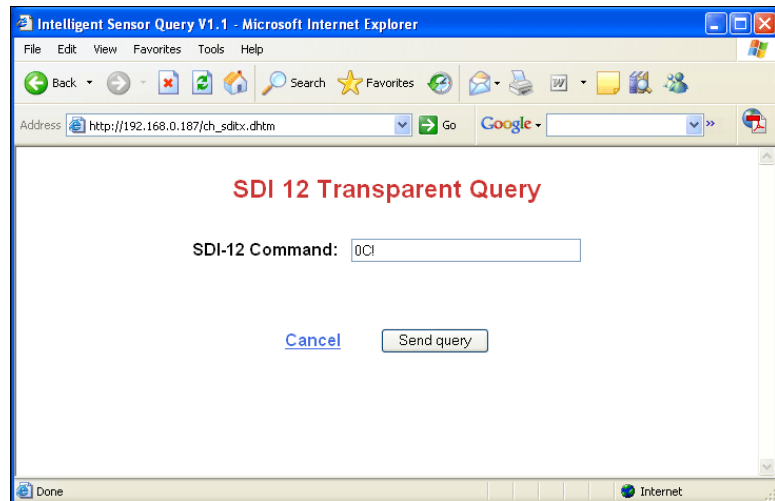
1. You can mix Spider’s native inputs with the SDI-12 inputs as required. To do that, simply select the required channel type from the drop-down list in the “Type” column.
2. A channel reading of -99999 indicates that the Spider is not able to communicate with the sensor. Check the SDI delay (warm-up) time, verify the SDI address is set to 0, and check all physical connections.

SDI-12 Transparent Mode

SDI-12 Transparent Mode is provided as an interactive tool for direct communications with attached SDI-12 sensor(s). It allows users to interrogate sensors, verify their operation, etc.

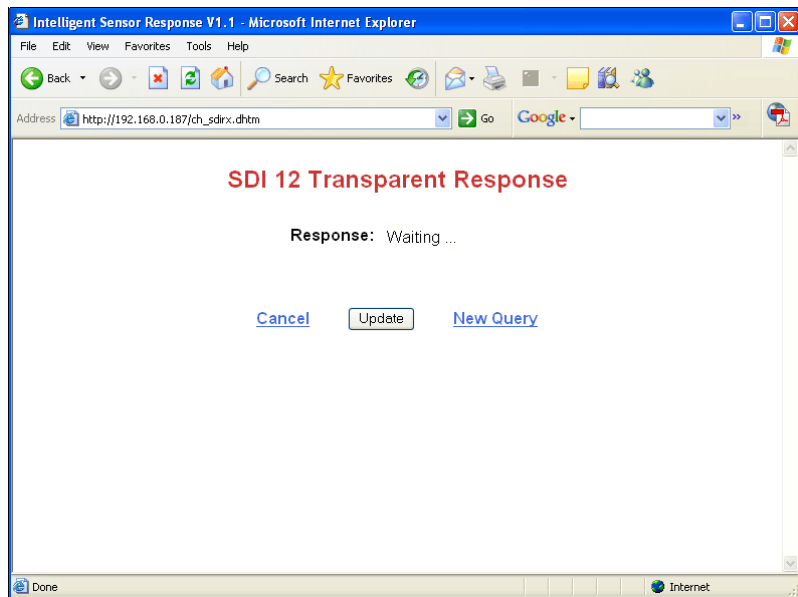
To enter the SDI-12 Transparent mode, access the “CHANGE SETUP” page, as described in *Setting up a Spider for the First Time* on page 32.

Click “SDI-12 Transparent Mode”. The following page will display:



NOTE: This page is not available unless you have enabled at least one SDI-12 sensor in the “Change Inputs” menu.

Enter an SDI-12 command and click “Send query”. A progress page will display:



Click "Update" to read the sensor response:

