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Form Information

Site Name	NSW Department of Industry
Site Id	47409
Page Standard Name	NSW Government's Water Reform Action Plan
Page Standard Id	134654
Page Custom Form Name	Submissions on draft metering regulation and policies
Page Custom Form Id	171616
Url	https://www.industry.nsw.gov.au/water-reform/make-a-submission
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Halytech loggers - some general key points

- Halytech has a range of hi tech yet simple to use loggers for integrated monitoring, control and alarming designed for remote, low power, battery powered applications.

- Logger types are differentiated mainly by the number of inputs to be recorded, control function, logger size and ingress protection, selected as required for various monitoring applications and site conditions, however are all generically the same as far as setting up, alarming, controlling and reporting *(some differences in Iridium satellite modem systems).*

- No software modifications are required to cater for different applications.

- All Halytech loggers have an on board, integrated web server and *no proprietary software is required;* setting up and interrogating a logger is a simple matter of viewing pages with any standard web browser.

- All loggers use open internet protocols and data formats that can be used on any computer or software platform.

- Halytech loggers do not rely on any Halytech or any other third-party servers, rather all the 'smarts' are built-in so that the data goes directly to you, from you or to your own systems by email, FTP, HTTP.

- Inputs recorded can include Switch, Counter, Analogue, Event, Quadrature, Difference (typically used for flow meters with forward and reverse outputs) as well as system inputs such as battery, solar, system temperature etc any of which can be set up with alarms and can be logged at different frequencies, user selectable from 1 second to 24 hours.

- Options of "intelligent inputs" for SDI-12 or Modbus sensors (or a mixture of both) can connected via an external SDI-12 or RS-485 hardware interface.

- Regardless of the logging periods or input type, all channels are logged automatically every midnight. This ensures that at least one sample is recorded every day, even with slowly varying inputs.

- Super channels are available which enable the user to feed one or more existing channels (native, intelligent or system) into a super channel to transform the input data e.g. Rating Table takes an input channel and applies linear or logarithmic interpolation based on a lookup table generated by Hydstra software; Ax + By + C takes two input channels and adds or subtracts them, optionally scaling the inputs and/or adding a fixed offset. Most commonly, this allows the sum or difference of two inputs to be calculated.

- Super channels are included in reports and can be used to trigger alarms, in the same way as native or system input channels.

- Data is logged 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. *(Data loggers with integrated Iridium satellite modem are set up in much the same way as loggers with integrated cell phone modem, however telemetered reports are sent as short burst data compressed files attached to emails – some two way communication is available).*

- Controls can be set up to include Switch Power out for powering up attached sensors, an open collector for activating autosamplers and low voltage out for powering up low voltage sensors (3.3V or 5V user selectable).

- Upon triggering, an alarm can send alerts as SMS messages, emails, and tweets; send report(s): over email and FTP; turn controls on and off or pulsed**; c**hange the logging rate to log faster for the duration of an alarm condition.

- Options are available for Live SMS which enables you to connect directly with a remote logger (within cellular network coverage) without any third-party portal, from anywhere in the world with internet access, using any web browser and any PC, Mac, iPad, iPhone or tablet or operating system.

- Live SMS allows the logger to receive, reply and act on SMS messages in real time, and to remotely access the unit via a web browser. This allows the user to instantly change settings, request reports, get system information at any time, and acknowledge alarms

- A report is a file that contains the logged data. The loggers are capable of generating reports in a number of different formats, and reports can be retrieved from or sent by the loggers in a few different ways: Manually using the web interface: The user can download part or all of the logged data. Automatically: A logger can be configured to automatically send out reports over email, FTP and/or HTTP on a periodic basis. Alarms: A logger can be configured to automatically send reports over email, FTP and/or HTTP whenever an alarm occurs. Manually by requesting it with an SMS message: a report can be triggered by sending the logger an SMS report request.

- Options are available for integration with SCADA systems using DNP3 protocol while still performing as a local black box system, independently monitoring, recording, alarming, controlling and reporting.

- Distributed Network Protocol (DNP3) option, allows a logger to participate in a SCADA environment as an intelligent remote terminal unit (RTU) or outstation, where it is monitored by a central master station or server. The loggers comply with the level 2 subset of the DNP3 protocol (DNP3-L2). To support low-power operation, the loggers can be configured to connect to the DNP3 server and transmit logged data (via “unsolicited responses”) periodically and/or whenever specific alarms are triggered. No special SIM or IP addressing is required.

- There are no ongoing license fees or server fees payable to Halytech just your own SIM card.

- Halytech data loggers are ultra-low powered using only 65 micro Amps on standby.

- Modems, including cellular or Iridium satellite are integrated within the hydroSpider2 and microSpider2 data loggers and not a separate component.

- Halytech loggers are highly reliable are easy to install and use, even in the most challenging environments.

- Automatic software upgrades allow the loggers to download new software files from a remote server. This remote server can be either the Halytech Update Server, or your own self-managed FTP server.

- Centralised management provides the means of automatically and remotely changing the configuration overnight of any or all loggers in a network via your own or the Halytech FTP server.

- Log files include diagnostics file which record every action related to the logger including changes, login times, alarms, power on/power off and calibration changes.

- We log going into and out of change setup mode, but not whether or not anything changed. It would not be difficult to log a *"something was changed"* message and also include this in a telemetered report with what has been changed.

- We can setup tamper alarms on inputs – no problem. Tamper detection through the cable is simply a looped wire monitored as an input channel.

- It is possible to erase the log file, but Halytech does not provide a user method to do that. Even if the user learns how, the erasure leaves a "log erased" message behind, so it will always be evident that the stored data was erased.

- Generating an alarm could be part of the tamper strategy, maybe have special channels for secure metering which have limits on what can be changed and inbuilt alarm strategies ie calibration changes, tamper detection….

- The microSpider2, microSpider Lite and hydroSpider2 all have a total capacity of 400,000 records however a portion of this is allocated to overheads such as diagnostic files and system input records.

- The Spider SMS logger which can take up to 8 inputs has a capacity of 25,000 records. This logger along with receiver and transmitters installed on remote transmitters can record up to 8 remote water meters within a 1km line of sight.

Iridium Satellite Telemetry systems:

- A Halytech logger (microSpider2) with Iridium Satellite is capable of sending data from anywhere on the Earth with a view of the sky. This is achieved through an on-board Iridium Satellite Short-Burst-Data (SBD) modem, which can send data via the global Iridium Satellite network. This on-board Iridium SBD modem takes the place of the microSpider2 3G modem, and so the microSpider2 Satellite is targeted towards use in remote locations with unreliable or no access to the phone network.
- Any SBD message, including SBD reports, which are sent by the microSpider2 will be automatically delivered as an attachment to an email by the Iridium network system. The recipients of these emails are specified in your Iridium network account rather than in the microSpider2.
- SBD messages sent over the Iridium Satellite network are often charged per byte, which means that longer/larger messages incur a higher cost. To address this, we have developed special compressed SBD report formats which minimise the amount of data sent over the Iridium network. This significantly reduces the on-going running cost of the microSpider2 Satellite system.
- Because the data is sent in the special compressed report formats, all SBD messages received from the microSpider2 Satellite need to be decoded before the data can be viewed in a readable format. This step is as simple as inputting the received SBD data file into the supplied SBD decoder program, and can even be automated.
- *Since microSpider2 Satellite units are equipped with an Iridium Satellite modem in place of a 3G modem, they are unable to access the 3G phone network and therefore don't have mobile*

internet and will not have the following features: Twitter, Email, DNP3, Automatic Setup Updates, and Automatic Software Upgrades.

- SBD reporting options are:
  Report Frequency: How often SBD reports are to be sent out can be set to: 20 minutes, 30 minutes, 1 hour, 2 hours, 3 hours, 4 hours, 6 hours, 12 hours, or 1 day.
- Iridium satellite email reports contain the following information: a unique modem number, or IMEI (in the sample: 300234011628120) which can be used to differentiate messages from multiple different microSpider2 Satellite units; the approximate longitude/latitude coordinates of the device which sent the message; the time/date the message was sent; The SBD message data itself as an attachment in compressed file format.
- It is possible to send commands to the microSpider via email to the Iridium system to update the configuration of the device and changes recorded in a log file.

Note 1 *that currently the hydroSpider2 does not have the option of Iridium satellite modem in place of the 3G cellular modem.*

Note 2 *Halytech has recently developed a micoSpider XS which uses a cellular modem with fall back and switching to Iridium satellite modem and SBD sending at times when the cellular network signal is unavailable.*

Note 3 *Halytech has started the production of the microSpider Lite which is also IP68 rated, with options of Live SMS and DNP3 but not the option of the Iridium satellite modem.*