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# XL Series Supplement Notes For Version 4.XX

## Summary of Major Changes

This document discusses the changes of the XL Series data logger that were added in version 4.00; 4.10; 4.11; and 4.12. The XL Series of data loggers includes the following products.

H-500XL	Basic XL Series data logger.
H-350XL	Basic XL Series data logger with built in pressure transducer.
H-510XL	Basic XL Series data logger with built in shaft encoder.
H-522Plus	Basic XL Series data logger with built in GOES HDR transmitter.
H-522	Basic XL Series data logger with built in GOES HDR transmitter, but no built in keypad / display.

**STOP!** There are a couple of changes that are important to look at before and after updating to this version. The first is related to item # 1 below. There is a new data card option that uses SD cards and USB. The new firmware will try to determine the card type on the first time power up. If this fails then the data options may not function as expected. To see if this is set correctly go into the Data Options menu and look at the internal card status to see if it is ok or has errors. If it has errors call so we can tell you how to resolve this issue.

The second is related to item #6 below. The RemStg option was removed and replaced with SDI-12 Tasks. There was no easy way to use an older config file and have the RemStg options automatically transfer into the new SDI-12 Task options. If RemStg was used in the past then the config file will load all the options except the RemStg settings and the user will have to manually setup the SDI-12 tasks to replace that functionality. Note also that the new SDI-12 Tasks are only implemented in the PC menu at this time and will be added to the built in keypad / display on a later version.

## Version 4.00 Summary Of Changes.

- 1 - The older ATA data cards are harder to find and the socket is now obsolete so the main change was to move to the SD data cards and the USB thumb drives for data storage and transfer. This was the main reason for this release.
- 2 - Support for the Telonics GOES radio is now completely removed. This was disabled in an earlier release but is now completely removed.
- 3 - Fixed a problem that may cause the GOES options to NOT load correctly when loading setups from a config file.

## Version 4.10 Summary Of Changes.

- 4 - Options for the 'Canadian' user mode were added to comply with the Canadian Standing

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Offer. These changes will not affect any of the current customers using 'Normal' user mode.

- 5 - Changed the data parity for the MSAT data transmissions. This will only affect those using the Mid Eastern satellite system.
- 6 - Removed RemStg and added SDI Tasks.
- 7 - Fixed event counter from counting up if bucket is broken holding input low.
- 8 - Added command to set the time using SDI-12 commands.

## Version 4.11 Summary Of Changes.

- 9 - Fixed a table pointer error introduced in version 4.10 that caused the functions to be miss aligned. This only affected the H-350XL not the other XL series loggers.

## Version 4.12 Summary Of Changes.

- 10 - Added support for the new Insat satellite radio for use in India. This was the main reason for this release.
- 11 - Fixed the GOES rounding problem when using binary data.
- 12 - Added support for the H3553 bubbler.

**NOTE:** After updating a unit look over the user options to make sure they look normal. Since newer versions of firmware will have new, deleted and changed options, a configuration file generated by an older version may not load 100% as expected.

## 1.0 Data Card Changes

In general, all the old menu options regarding the data cards are still present when using the newer SD cards and USB thumb drive. The main difference with the original options is there is one more choice for the USB thumb drive. For example now when erasing a device instead of the options just being the internal or external memory, the USB thumb drive is also a valid option. The performance between the old and the new card types is basically the same using the original options. Some of the newer options will greatly enhance the operation of the data logger such as data transfers as discussed below.

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## 1.1 SD Cards

The internal and external SD cards basically take the place of the older ATA cards. The operation with these two cards is the same as before. SD cards are a newer technology and are easier to obtain. There is an LED next to the external SD card that lights up whenever this card is active.

## 1.2 USB Thumb Drive

The external thumb drive is new and is used in the same manor as the external SD card. Data can be copied to this drive for normal data retrieval activities.

## 1.3 Mini USB Connection (Device Mode)

The mini USB connection is used as a direct connect to a PC. Device mode will cause the two SD cards to look like external hard drives to the PC. The benefits of using device mode is it allows files to be dragged from the SD cards on the XL to the hard drive on the PC using normal windows drag and drop procedures. To enter device mode make sure a cable is connecting the PC to the XL and then use one of the methods below to start the device mode operation.

### Local Keypad / Display:

To enter device mode from the local build in keypad / display menu, scroll down to the “Data Options” menu, then press the right arrow to enter this sub menu. The first option in this menu is the option to activate device mode.

```
Enter Device Mode?
```

Pressing the Enter key will activate the device mode. When in the device mode scanning is suspended. A message indicating this is displayed for a couple of seconds.

```
Scanning Suspended
```

After a couple of seconds the following message is displayed.

```
Device Mode Active
```

This message will stay displayed until the ESC key is pressed causing the unit to return to normal operation, or the system times out and returns to normal mode of operation. This timeout is 15 minutes.

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## Side Button Option:

The side button can be programmed to activate the device mode. Use the menu option to set the side button mode to “USB Device Sel”. With the side button set as described and the unit a sleep, pressing the side button will activate the device mode. The display will turn on and show the following messages with about a 2 second delay between.

Entering Device Mode

Scanning Suspended

After a couple of seconds the following message stays displayed until the side button is pressed again causing the unit to return to the low power sleep mode.

Device Mode Active

To exit device mode press the side button again, the following message will be displayed.

Exiting Device Mode

**NOTE:** There is not an option to enter ‘Device Mode’ from the PC menu over the serial port. When using the ‘Device Mode’ the PC menu would normally not be in use.

## 1.4 Mini USB Connection (Com Port Mode)

The mini USB connection can also be used as a serial port and mainly intended for newer laptops that do not support traditional RS232 ports. This eliminates the need to have a USB to serial adapter, as that functionality is built into the new USB port.

Before this options is used a Serial Port Driver must be loaded onto your PC. The driver is found on our web page at [www.waterlog.com](http://www.waterlog.com). Look under the ‘Products’ tab for data loggers and select any of the XL series loggers, then look for the ‘USB Driver’ download option.

This driver is also on the CD that is sent out with each new XL series logger.

Once the driver is loaded a terminal emulator program like Hyperterm can be used to communicate with the XL. In Hyperterm a new serial port option will be available when the USB cable is plugged into the XL and the PC. Select the new com port and continue to communicate with the XL as if on a normal com port.

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## **2.0 Telonics GOES radio no longer supported.**

The Telonics GOES radio is out of date, has not been sold for close to 10 years now and has not been able to be repaired for close to 5 or 6 years. Support for this radio has been completely removed. If customers are still trying to use this radio they must use an earlier version of firmware.

## **3.0 GOES Options not loading correctly from a config file.**

More checks have been added to ensure that options to remote devices are loaded correctly. If specific options are noticed as not loading correctly please call the office and report this.

## **Version 4.10 Summary Of Changes.**

### **4.0 Canadian Mode Options.**

Several options were added for the Canadian mode of operation that deviate from the normal mode of operation that the current customer base is accustomed to using. Most of these options are only valid if the user mode is set to 'Canada'. An example of these changes is to have 5 minute data logged with a time tag in minutes of 54, 59, 04, 09 etc instead of 55, 00, 05, 10 etc.

### **5.0 MSAT Parity.**

This change will only affect those users in the middle east and using their satellite system. Data will now come in without needed post processing.

### **6.0 RemStg was removed and SDI-12 Tasks were added.**

Users liked the RemStg option and have ask for more of them. RemStg was never a good name for this option but did work for the customer who requested it. At this same time we have had to upgrade the SDI-12 functionality. Now 10 SDI-Tasks have been added and function the same as RemStg. The SDI-Tasks also provide for more flexibility in the SDI-12 aspect.

Currently the SDI-Tasks are only available using the PC menu. In time they will be added to the built in keypad / display.

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Advanced SDI-12 Tasks		(Esc To Return)			
T - Time Out Value:           0.00					
U - Use Timeout Value: Yes					
R - Reset to Defaults					
S - Scan Sensor					
Advanced SDI-12 Task Number					
Task Number	[1]	2	3	4	5
-----+-----+-----+-----+-----					
A - Address	0	0	0	0	0
P - Parameter	1	1	1	1	1
M - Meas Type	M	M	M	M	M
C - Com Port	SDI-12	SDI-12	SDI-12	SDI-12	SDI-12
S - Slope	1.000	1.000	1.000	1.000	1.000
O - Offset	0.000	0.000	0.000	0.000	0.000
V - Value	12.34	0.000	0.000	0.000	0.000
-> - Next					
<- - Previous					
Enter Option >					

**T - Time Out Value:**

The time out value is the value that will be used (logged, transmitted, etc) if communication to the sensor failed.

**U - Use Timeout Value?:**

The 'Use Timeout Value?' option is a 'Yes' or 'No' question. If set to yes then the timeout value will be used if the sensor fails. If set to no then the last value from the sensor will be used.

**R - Reset to Defaults:**

This is used to reset all options on this screen back to factory defaults.

**S - Scan Sensor:**

This option is used to scan the selected sensor. If the brackets are on column 2 and it is set to address 3, then the sensor at address 3 will be measured based on the measurement type selected. If other SDI-12 tasks use the same address and measurement type, they will be updated also.

**A - Address:**

This option is used to select the address to use for the selected task. Normally it is a number from 0 to 9 but can be a single letter also, normally a capital letter.

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## **P - Parameter:**

This option is used to select the parameter to use for the selected task. Since each task relates to a single value, each parameter for each address must be selected.

## **M - Meas Type:**

This option is used to select the measurement type to use for the selected task. Using two different tasks, a single sensor could be accessed using two different measurement types.

## **C - Com Port:**

This option is used to select what com port the SDI-12 communication will use. The default is the standard SDI-12 port but could be one of the RS232 ports. When using one of the RS232 ports an H-4191 must also be used.

## **S - Slope:**

This option is used to set a slope value for the selected address and parameter.

## **O - Offset:**

This option is used to set an offset to use for the selected address and parameter.

## **V - Value:**

This option is used to see the current value of the sensor and parameter. It can also be used to automatically set the offset based on the user entering in the desired value.

## **7.0 Event Counter Fix:**

If a tipping bucket failed or used a switch that was normally closed, the counter would increment one count each time the logger was turned on. An typical scenario would be the counter shows 96 counts a day based on the 15 minute scan rate. Now the counter is looking better for the edge or transition from high to low on the counter input, not just a level.

## **8.0 SDI-12 Commands To Set Time:**

The need came up to set the time of the logger using SDI-12 when two loggers are at the same site and one is connected to GOES that is synced to GPS and the other is acting as a slave. This allows the main logger to keep the slave logger synced to the same time. The command format is as follows:

aXSTHH:MM:SS!

If the time is out of range the command will fail and the time will not be updated. If the command passes the following response will be sent:

aOK←

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## Version 4.11 Summary Of Changes.

### 9.0 Source Table Pointer Error:

In version 4.10 a pointer in a source table was miss aligned causing the functions to be offset by one, for example a reference to fnt01 would actually call fnt02. This only affected the H-350XL and not the other XL series loggers. This bug was found within a couple of days and was resolved quickly. Now there are very few version 4.10 units that were shipped so the problem is not wide spread. If you find you have a version 4.10 just upgrade to a later version.

## Version 4.12 Summary Of Changes.

### 10.0 Insat Support:

Several options were added for the Insat satellite radio used in India. These options will not be discussed here as the only pertain to a small subset of the customer base, and the unit must have the user mode set to 'Insat'.

### 11.0 GOES Rounding On Binary Data:

When the options were added to allow the user to set the number of bytes, digits etc for binary data the proper rounding technic was removed and the values for binary data were truncated. This change in data caused concern when the logged data and the transmitted data no longer matched but 50% of the time would be off by 0.01. Proper rounding is now in place again.

### 12.0 Added Support For The New H3553 Bubbler:

The new H-3553 bubbler includes a built in precision pressure sensor. The H-3553 has several ways to set it up for operation. SDI-12 is one communication option. The XL series logger uses the SDI-12 port to communicate with it for setup and normal data collection. For normal scanning and data collection treat the H-3553 like the H-350 Lt sensor. For setup through the XL series loggers, the "Accessory Setup" menu has been changed and a new menu directly related to the H3553 has been added:

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```
Accessory Setup          (Esc to Return)

P - H-355 Gas Purge Setup

A - H-3553 Gas Purge Setup (At Address x)
B - H-3553 Gas Purge Setup (At Address y)
C - H-3553 Gas Purge Setup (At Address z)

L - Look for H-3553 Systems.

Enter Option >
```

Options A, B, C and L are new.

Up to three H-3553 systems can be connected to the XL series logger and use this menu. The looks of this menu will change based on the number of units connected and its current SDI-12 address.

The A, B, and C options will all go to the same menu to control an H-3553 but the actual unit will depend on the SDI-12 address listed on the screen.

The 'L' option is used to look for H-3553 systems. If only one unit is connected then only option 'A' will be listed. Up to three H-3553 units will be listed here. If more are used then they must be accessed directly using the SDI-12 commands directly in the SDI-12 transparent mode. In most cases only one unit will be connected at a time. In a few cases two units will be used, mainly head and tail water type of applications. Three units is not expected but would work.

Once an A, B or C option is issued the following menu is active.

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```
H-3553 Gas Purge Stage Sensor Setup      (At Address x)

=== Stage Settings ===
S - Stage:      12.34
L - Slope:      2.3067
O - Offset:      0.000
A - Samples:     8

=== Bubbler Settings ===
      Tank Pressure:  3.251    PSI
      Line Pressure:  0.283    PSI
B - Bubble Rate:     60      Per Minute
P - Purge Pressure:  30      PSI (69.20 feet)
D - Purge Sustain:   10      Seconds
T - Timed Purge:     7       Days
M - Manual Purge

U - Update All Values

Enter Option >
```

This screen is split into two sections, one for the stage settings and one for the bubbler settings.

## Stage Settings:

### S - Stage:

This option is used to see the last measured stage value or to set the stage value and have the offset automatically adjusted as needed.

### L - Slope:

The slope is used to convert the pressure value into desired units such as feet or meters. A slope of 2.3067 is the default and gives values in feet.

### O - Offset:

The offset is used to correct for differences between the orifice line depth and the actual water level depth based on some preset reference point.

### A - Samples:

The samples option is used to set the number of readings to average to compute the final value. The default is 8 which is also the minimum number of samples. The more samples used will result in smoother data at the cost of taking longer to do the measurement.

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## **Bubbler Settings:**

### **Tank Pressure:**

This is a status screen that shows the amount of pressure in the tank.

### **Line Pressure:**

This is a status screen that shows the pressure in the line caused by the head of water.

### **B - Bubble Rate:**

This option is used to set the average number of bubbles per minute that are flowing from the end of the orifice line. This is based on a 1/8 inch ID orifice line.

### **P - Purge Pressure:**

This option is used to set the purge pressure. The purge pressure should be significantly greater than the line pressure would be when the water level is at its highest.

### **D - Purge Sustain:**

The purging process in the H-3553 is slightly different from the original H-355 bubbler system. The main difference is a purge sustain time verses the old purge duration time. The new process is as follows:

- 1 - A purge is requested, either manually or automatically.
- 2 - The H-3553 makes a stage measurement. This value will be used if a measurement request comes in during the purging process.
- 3 - The H-3553 turns off the pressure from the sensor.
- 4 - The pump turns on and builds up the pressure until it reaches the purge pressure setting.
- 5 - The H-3553 continues to pump but also opens the valve releasing the full tank pressure to the orifice line.
- 6 - The pump will continue to run until the time set in the 'Purge Sustain' option has elapsed. This time value is in seconds.
- 7 - Once the purge sustain time has elapsed the pump will turn off.
- 8 - The H-3553 monitors the line pressure waiting for it to stabilize indicating the purge is complete.
- 9 - The line pressure is again opened to the sensor and the purge value is closed.
- 10 - The H-3553 normally will turn on for just a second or two to maintain the bubble rate.

### **T - Timed Purge:**

This option enables timed purging and sets the number of days between purges. The default is 0 which is disabled. A value of 1 indicates purging is to be done every day. A 2 would be purge every other day. A 7 would be once a week. The purge will happen just after the measurement at or after 12 noon.

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## **M - Manual Purge**

This option is used to force a manual purge. This should not be done just before a measurement as it may affect the measurement data.

## **U - Update All Values**

Some of the values displayed on this screen may be a few seconds to a few minutes old. This option is used to update the values so changes can be detected, or operation verified.